Technical Study 16

THE COSTS OF PROTECTING JOBS IN 100 CANADIAN MANUFACTURING INDUSTRIES

Tim Hazledine

July 1981

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ABSTRACT

THE COSTS OF PROTECTING JOBS IN 100 CANADIAN MANUFACTURING INDUSTRIES

Tim Hazledine

Tariff and non-tariff protection from import competition varies considerably across Canadian manufacturing industries. Does the pattern of protection make sense? This study attempts to answer this question. Estimates are developed for each industry of (a) the effect of protection on output and employment and of (b) the associated costs. A figure can then be calculated for the cost per job saved.

The analytical procedure is to ask, for each manufacturing industry in turn, What would happen if the tariff were eliminated from competing imports and from material inputs?

The methodology departs from the simple "law of one price" assumption of traditional trade theory, which has the prices of domestic output reflecting in full any changes in the tariffs imposed on competing imports. Economists who have studied the effects of tariffs on particular markets have found that, in general, this "law" does not hold.

A tariff cut may reduce output and employment by forcing out the highest-cost domestic producers. It could also stimulate demand for domestic output through its effect on domestic prices. This stimulative effect can be large enough to outweigh any loss of jobs in high-cost establishments that could not compete at the lower prices. That is, in such industries, the net effect of the tariff is to reduce industry employment.

A tariff or non-tariff barrier imposes two sorts of economic costs: (a) through distortion of consumption patterns, when market prices are raised above marginal costs; and (b) through distortion of the allocation of production, when goods are supplied from high-cost domestic sources, instead of, from cheaper imports or lower-cost domestic producers. There could also be consumer welfare losses associated with the reduction in choice that would follow the loss of some domestic sources of supply, should tariffs be removed.

The study presents estimates of these costs and benefits of protection and compares them with the effects on employment.

The study pays considerable attention to the realistic specification of pricing behaviour in Canadian industries subject to import competition.

Our findings are (a) that tariff and non-tariff protection against imports does, in general, come at a cost; (b) that, in many cases, those costs do not have a payoff in net jobs saved; and (c) that when there is a payoff in jobs, the cost per job saved differs considerably across industries.

The economic waste attributable to tariff and non-tariff protection in Canadian manufacturing industries totalled $740 million in 1978. With a discount rate of 10 per cent, this waste would have a present value of $7.4 billion (higher in 1981 dollars).

The net payoff for this protection is estimated to be 40,000 jobs saved. Thus, it cost, on average, about $18,500 to protect each manufacturing job, while the average wage or salary payment in Canadian manufacturing in 1978 was $14,800.

It would thus appear actually to benefit the Canadian economy if each of the 40,000 protected workers were paid their wage or salary not to work, even under the unrealistic assumptions that none of them would find other employment and that there are no costs to being employed.

The figure of 40,000 jobs is the net effect of two opposing tendencies. The model predicts that the direct effect of loss of protection would be loss of 148,000 jobs in marginal plants, but that 108,000 new jobs would be created by the expansion of lower-cost plants. It is this potential for within-industry rationalization towards more efficient firms that is the major "opportunity cost" of protection, and which accounts for most of the $740 million of waste.

As a further test of the model's reliability the industries with the highest costs of protection were subjected to detailed case studies.

In some industries (textiles, shipbuilding, dairy processing) a relatively large proportion of 1978 employment is vulnerable to loss of protection, while in others (clothing, electrical products, miscellaneous chemicals) the net effect is smaller, due to the job gains of low-cost plants almost matching those lost from high-cost capacity.

The cost-per-job numbers also vary, with the lowest figures tending to be in those industries with the largest numbers of jobs saved.

However, in general, it seems likely that the costs of delivering jobs by means of tariff or non-tariff protection exceed the costs that would be associated with programs 'targeted' specifically at those firms and employees who would be negatively affected by loss of protection.

The major conclusions of this study are that

(1) existing tariff and non-tariff protection saves fewer Canadian jobs than might intuitively be expected;

(2) the economic cost per job saved can be very high;

(3) both the costs and the employment effects of protection are concentrated in a small number of industries.

The policy prescriptions are:

(1) An across-the-board elimination of tariffs would yield major efficiency gains with relatively small employment effects. Such a tariff cut might be achieved as part of a free-trade agreement with Canada's major trading partner, the United States, negotiated under the provisions of Article 24 of the GATT.

(2) The unusually high protection granted, mostly by non-tariff policies such as quotas or subsidies, to particular industries (clothing, footwear, shipbuilding) generates particularly high costs. Therefore, prior to the negotiation of a free-trade agreement with the United States, which would no doubt be a lengthy process, substantial efficiency gains could be realized by regularising protection through reductions in tariffs or non-tariff barriers in these industries.

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LE COÛT DE LA PROTECTION D'EMPLOIS DANS 100 INDUSTRIES MANUFACTURIÈRES CANADIENNES

Tim Hazledine

Les mesures de protection tarifaires et non tarifaires contre la concurrence des importations varient de beaucoup d'une industrie manufacturière à l'autre au Canada. Ces mesures de protection ont-elles leur place? Telle est la question à laquelle l'étude tente de répondre. Pour chaque industrie, nous donnons des estimations a) des effets de la protection sur la production et l'emploi et b) des coûts de cette protection. On peut ensuite comparer ces deux facteurs pour obtenir le coût par emploi conservé.

Dans notre analyse, nous nous sommes demandé, pour chacune des industries manufacturières, ce qui arriverait si l'on abolissait les droits qui frappent les importations concurentielles et les intrants matériels de sa production.

La méthodologie utilisée s'écarte de la simple hypothèse du prix unique de la théorie commerciale traditionnelle, selon laquelle les prix des produits intérieurs reflètent intégralement toute modification apportée aux tarifs imposés aux importations concurentielles. Les économistes qui ont étudié les effets des tarifs sur des marchés particuliers ont constaté qu'en général ce principe ne tient pas. L'aptitude des entreprises canadiennes à tirer profit des mesures de protection semble être tributaire de facteurs comme l'interchangeabilité des importations et des produits intérieurs et la concentration des produits de l'industrie sur le marché.

Une réduction tarifaire pourrait entraîner une diminution de la production et de l'emploi au Canada en obligeant les entreprises qui produisent à coût élevé à

fermer leurs portes. En revanche, cette réduction pourrait stimuler la demande pour la production intérieure grâce à son incidence sur les prix intérieurs. Cet effet de stimulation pourrait être assez important pour compenser toute perte d'emplois dans les établissements qui produisent à coût élevé et qui ne pourraient pas soutenir la concurrence des entreprises dont les produits sont moins chers. C'est dire que, dans ces industries, l'effet net du tarif est de réduire l'emploi.

Une barrière tarifaire ou non tarifaire impose deux sortes de coûts économiques: a) par la distorsion de la courbe de consommation, lorsque les prix du marché s'élèvent au-dessus du coût marginal; et b) par la distorsion de la répartition de la production, lorsque les biens proviennent des entreprises intérieures qui produisent à coût élevé au lieu des importations moins cher ou des entreprises intérieures qui produisent à faible coût. D'autre part, les consommateurs pourraient y perdre puisqu'ils auraient ainsi moins de choix si l'on supprimait les tarifs, forçant ainsi certains producteurs canadiens à fermer leurs portes.

L'étude présente une estimation des coûts et des avantages de la protection tarifaire et les compare aux effets de cette protection sur l'emploi.

Nous accordons une attention toute spéciale aux caractéristiques réalistes du comportement des prix dans les industries canadiennes qui doivent soutenir la concurrence des importations.

Nous avons constaté que a) la protection tarifaire et non tarifaire contre les importations suppose en général certains coûts; b) dans biens des cas, ces coûts ne sont pas

compensés par le nombre net d'emplois conservés; et c) dans le cas contraire, le coût par emploi conservé varie beaucoup d'une industrie à l'autre.

La perte économique imputable aux mesures de protections tarifaires et non tarifaires dans les industries manufacturières canadiennes s'élevait à $740 millions en 1978. A supposer un taux d'escompte de 10%, ces pertes seraient actuellement évaluées à $7,4 milliards (et à plus encore en dollars de 1981).

Les avantages nets des mesures de protection se traduisent, selon nos estimations, par 40 000 emplois conservés. Ainsi, il en coûte, en moyenne, quelque 18 500 $ (dollars de 1978) pour protéger chaque emploi du secteur manufacturier. Signalons que le salaire moyen dans ce secteur au Canada s'établissait à 14 800 $ en 1978.

Il semble donc que l'économie canadienne y gagnerait si chacun des 40 000 travailleurs protégés était payé pour ne pas travailler, même dans l'hypothèse peu réaliste qu'aucun d'entre eux ne trouverait un autre emploi et que le fait d'être employé ne supposerait aucun coût.

Ce chiffre de 40 000 emplois représente l'effet net de deux tendances opposées. Selon notre modèle, l'abolition des mesures de protection aurait pour effet direct d'entraîner la perte de 148 000 emplois dans les entreprises les moins efficaces, mais que 108 000 nouveaux emplois seraient créés par suite de l'expansion des entreprises qui produisent à faible coût. C'est précisément cette possibilité de rationalisation au sein de l'industrie visant les entreprises les plus efficaces qui représente le principal "coût d'option" des mesures de protection et qui compte pour la plupart des $740 millions perdus.

Pour éprouver davantage la fiabilité du modèle, nous avons étudié à fond, cas par cas, les industries pour lesquelles les mesures de protection coûtent le plus cher.

Pour certaines industries (textiles, construction navale et industrie laitière), une proportion relativement importante des emplois (en 1978) est vulnérable à l'abolition des mesures de protection, tandis que, pour d'autres (vêtement, produits électriques, produits chimiques divers), l'effet net est moindre, en raison des emplois créés dans les usines qui produisent à faible coût et qui équivalent presque aux emplois perdus par suite de la fermeture des entreprises qui produisent à grands frais.

Le coût par emploi varie également, le plus faible étant enregistré dans les industries où le nombre des emplois conservés est le plus grand.

Cependant, il semble probable en général que les coûts liés à la protection d'emplois grâce aux barrières tarifaires ou non tarifaires dépassent, en raison des effets négatifs que cela suppose, les coûts liés aux programmes conçus précisément pour les entreprises et les employés qui seraient touchés par l'abolition des mesures de protection.

Voici les principales conclusions de l'étude:

1) Les mesures actuelles de protection tarifaire et non tarifaire protègent moins d'emplois au Canada que l'on ne serait porté à croire;

2) Le coût économique par emploi conservé peut être très élevé;

3) Le coût et les répercussions sur l'emploi des mesures de protection sont concentrés dans un petit nombre d'industries.

Mesures à prendre

1) L'élimination générale des tarifs entraînerait des gains importants sur le plan de l'efficacité et n'aurait que relativement peu d'effets sur l'emploi. Il serait des plus utile que cette élimination se fasse dans le cadre de l'accord de libre-échange conclu entre le Canada et son principal partenaire commercial, les États-Unis, négocié aux termes de l'article 24 du GATT.

2) La protection inhabituellement élevée accordée, dans la plupart des cas par l'intermédiaire de mesures non tarifaires comme les contingents ou les subventions, à des industries particulières (vêtement, chaussure et construction navale) se révèle très onéreuse. Par conséquent, avant de négocier un accord de libre-échange avec les États-Unis, ce qui prendrait sans doute beaucoup de temps, des gains importants sur le plan de l'efficacité pourraient être réalisés si l'on régularisait les mesures de protection par la réduction des barrières tarifaires ou non tarifaires dans ces industries.

EXECUTIVE SUMMARY

Introduction

Tariff and non-tariff protection from import competition varies considerably across Canadian manufacturing industries. Does the pattern of protection make sense? This study attempts to answer this question. Estimates are developed for each industry (a) of the effect on output and employment of protection, and (b) of the costs associated with the protection. The costs can then be compared with the employment effect to give a figure for the cost per job saved by protection.

Methodology

The analytical procedure is to ask, for each manufacturing industry in turn, what would happen should the tariff be eliminated from competing imports and from the material inputs used by the industry.

A tariff cut may reduce Canadian output and employment by forcing-out the highest-cost domestic producers. Against this, the tariff cut could stimulate demand for domestic output through its effect on domestic prices. This stimulative effect can be large enough to outweigh any loss of jobs in high-cost establishments that could not compete at the lower prices. That is, in such industries, the net effect of the tariff is to reduce industry employment.

A tariff or non-tariff barrier imposes two sorts of economic costs: (a) through the distortion of consumption patterns, when market prices are raised above marginal costs; and (b) through the distortion of the allocation of production, when goods are supplied from high-cost domestic sources, instead of, more cheaply, from imports or lower-cost domestic producers. Against this, there could be consumer welfare losses associated with the reduction in variety of choice that would follow the loss of some domestic sources of supply, should tariffs be removed.

The study presents estimates of these costs and benefits of protection and compares them with the effects on employment.

The methodology departs from the simple "law of one price" assumption of traditional trade theory, which has the prices of domestic output reflecting in full any changes in the tariffs imposed on competing imports. Economists who have studied the effects of tariffs on particular markets have found that, in general, this "law" does not hold. The ability of domestic firms to take advantage of protection appears to depend on factors such as the substitutability of imports for domestic output, and the degree of seller concentration of the domestic industry.

That is, it cannot generally be assumed that a one dollar tariff cut would lead to a one dollar fall in the prices of competing domestically produced goods.

The study pays considerable attention to the realistic specification of pricing behaviour in Canadian industries subject to import competition. Nevertheless, the model here used is not necessarily the only one that could be proposed. However, the detailed examination, in the Appendix to this study, of particularly sensitive protected industries does

seem to confirm the validity of the approach taken.

Results

Our findings are (a) that tariff and non-tariff protection against imports does, in general, come at a cost; (b) that, in many cases, those costs do not have a payoff in net jobs saved; (c) that when there is a payoff in jobs, the cost per job saved differs considerably across industries.

The sums of money involved are large. The quantitative analysis shows that, in total, the economic waste attributable to tariff and non-tariff protection in Canadian manufacturing industries was $740 million in 1978. With a discount rate of 10 per cent, these wastes would have a present value of $7.4 billion (higher in 1981 dollars).

The net payoff for the protection is estimated to be 40,000 jobs saved. Comparing this number with the $740 million, we can see that it cost, on average, about $18,500 in 1978 to protect each manufacturing jobs. To get an idea of the significance of this figure, note that the average wage or salary payment in Canadian manufacturing in 1978 was $14,800.

Thus, it would appear actually to benefit the Canadian economy if each of the 40,000 protected workers were paid their wage or salary not to work, even under the unrealistic assumptions that none of them would find other employment and that there are no costs (such as loss of leisure) to being employed.

The 40,000 jobs figure is the net effect of two opposing tendencies. The model predicts that the direct effect of loss of protection would be loss of 148,000 jobs in marginal

plants, but that 108,000 new jobs would be created by the expansion of lower cost plants, due both to the stimulus to demand of lower prices, and to the opportunity to take-over some of the markets vacated by the marginal capacity. It is this potential for within-industry rationalization towards more efficient firms that is the major 'opportunity cost' of protection, and which accounts for most of the $740 million of waste.

Though these results are computed for the particular year 1978, tests to compare conditions in this year with those in 1974 and 1970 suggest that the cost structure of Canadian industry is sufficiently slow-changing for the 1978 numbers to have long-term validity, though, of course, the figures would differ in detail were the analysis to be repeated on data for other years.

As a further test of the reliability of the model, the industries with the highest costs of protection were subjected to detailed case studies, which included interviews with industry experts in government departments. While supporting the general approach taken, these case studies led to some revision of the figures for particular industries.

The results for the industries subjected to the in-depth analysis are shown on the table. Together, these industries accounted for more than 60 per cent of the total economic costs due to protection in the Canadian manufacturing sector.

The table demonstrates the uneven impact of protection. In some industries (Textiles, Shipbuilding, Dairy Processing) a relatively large proportion of 1978 employment is vulnerable to loss of protection, while in others (Clothing,

Electrical Products, Miscellaneous Chemicals), the net effect is smaller, due to the job gains of low-cost plants almost matching those lost from high-cost capacity.

The cost per job numbers vary too, with the lowest figures tending to be in those industries with the largest jobs-saved numbers -- that is, in those industries for which protection actually delivers the most jobs.

However, in general, it seems likely that the costs of delivering jobs by means of tariff or non-tariff protection exceed, because of the negative spill-overs involved, the costs that would be associated with programs 'targeted' specifically at those firms and employees who would be negatively affected by loss of protection.

Table: Costs of Protection and Employment Effects in Selected Industries, 1978

	Costs of protection ($million)	Jobs saved	Percentage of 1978 employment	Costs per job ($)	Costs per $ wage
Clothing	137.6	2,275	2.0	60,484	6.24
Footwear	16.3	1,733	11.4	9,406	0.94
Textiles	98.9	11,091	22.6	8,917	0.74
Electrical	91.8	3,157	2.8	29,078	2.02
Shipbuilding and Repair	43.3	4,630	34.4	9,352	0.53
Industrial chemicals	22.4	2,634	10.3	8,504	0.41
Miscellaneous chemicals	19.9	574	3.6	34,669	2.27
Dairy processing	21.0	5,400	20.0	3,889	0.27

Conclusions

The major findings of this study are that

(1) existing tariff and non-tariff protection saves fewer Canadian jobs than might intuitively be expected

(2) the economic cost per job saved can be very high

(3) both the costs and the employment effects of protection are concentrated in a small number of industries.

Prescriptions

(1) An across-the-board elimination of tariffs would yield major efficiency gains with relatively small employment effects. Such a cut in tariffs might most usefully be achieved as part of free trade agreement with Canada's major trading partner, the U.S., negotiated under the provisions of Article 24 of the GATT.

(2) The unusually high protection granted, mostly by non-tariff policies such as quotas or subsidies, to particular industries (clothing, footwear, shipbuilding) generates particularly high costs. Therefore, prior to the negotiation of a free trade agreement with the U.S., which would no doubt be a lengthy process, substantial efficiency gains could be realized by regularising protection through reductions in tariffs or non-tariff barriers in these industries.

Future Work

The findings of this paper are potentially of considerable significance for employment policy, and their validity should be scrutinized. There are least two dimensions along which the research could usefully be developed:

First, the scope of the analysis could be extended by allowing for the 'general equilibrium' effects of protection -- that is, the effects that protection on one industry have on prices and employment in other industries, and the 'macro' consequences for the exchange rate of across-the-board changes in tariff policy.

Second, the findings for key industries could be tested by a 'micro' analysis, involving the collection and analysis of financial data on a firm-by-firm basis. The Statistics Canada data mostly used in this study are prone to problems with the allocation of costs in diversified firms, and with the effects of transfer pricing between the divisions of multinational enterprises. With the present value of costs of protection estimated here to be in the hundreds of millions of dollars in some industries, it would seem well worthwhile to subject these in-depth analysis, involving the scrutiny of accounting data of important firms.

Both these extensions of the research would pay-off in the formulation of future government policy, either as input into Canada's bargaining position in any future round of multilateral tariff negotiations, or to assist in government's response to requests for increases in proctetion made by particular Canadian firms or industries.

I. Introduction

This study reports estimates of the costs of protecting jobs with tariffs in one hundred Canadian manufacturing industries. Two sorts of calculations are involved: first, the effect on employment of the protection; second, the costs (if any) that this imposes on the economy, and the distribution of these costs.

The model used is grounded as far as possible in empirical evidence on the actual behaviour of prices and output in Canadian industrial markets. This 'industrial organisation' perspective is unusual in studies of the impact of tariffs, which have traditionally relied on simple, a priori assumptions about the nature of markets, summarized in the 'law-of-one-price' model of supply-determined output of a homogeneous product.

The break with orthodoxy is sharp enough, and its consequences sufficiently striking, to necessitate a careful review of the one-price model (section II) and justification of the alternative 'differentiated products' model used in this study (section III).

Our model is then exposited geometrically (section IV), and put in algebraic terms suitable for empirical implementation (V).

The data and results are given on a series of tables (Appendix A), which are explained in section VI. Section VII concludes the main body of the paper with some warnings about limitations of the study.

There are two other appendices. Appendix B examines the stability across time of the intra-industry distributions of costs, and Appendix C elaborates the formula used to predict domestic price changes following changes in tariffs.

Appendix D is an examination in detail of nine industries for which the model predicts costs of protection to be especially large.

II. The Law-of-One-Price Model

(a) Theory

A tariff imposed on an imported commodity affects the domestic market in two ways: directly, through the change in the price paid for the import by domestic consumers, and indirectly, through its effect on the price charged by the domestic producers of competing commodities.

The assumptions that have traditionally been made in order to measure these effects are: (1) the domestic economy is an import price-taker; (2) imports and domestic output are perfect substitutes; (3) marginal costs of domestic producers increase as output is increased.

The first assumption implies that the domestic economy cannot influence the price it pays on world markets for imports, so that the landed price of these will be raised by the full amount of any tariff imposed.

The second assumption implies that domestically produced and imported commodities must sell at the same price -- that is, that the 'law-of-one-price' holds. Along with assumption (1), this implies that the price charged by domestic producers will be raised by the full amount of the tariff on the competing imports.

The third assumption makes domestic output determinate. If production costs decreased or were constant with increases in output, there would be no limit to the amount domestic producers would wish to sell.

The one-price model and its implications for output and efficiency are illustrated, for an industry producing a particular product, on the right-hand side of Figure 1.

In the absence of a tariff, the price faced by domestic consumers and producers would be the world price, P_W. Domestic producers would wish to supply up to the point E, where marginal costs (MC) just equal price.

As drawn[1], however, domestic consumers will wish to consume at the point H on their demand curve. Thus, domestic consumption will be OD, domestic production OA, and the difference AD, will be imported.

Suppose now that a tariff, per unit, T, is imposed on the commodity. This raises the landed price of imports, and thus that of competing domestic output, to $P_W + T$. The higher price encourages more domestic output, but discourages domestic consumption, with the net result being a reduction in imports to BC.

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1. We have presented the case of an imported good, which is the one of the interest here. By shifting the D and MC curves, we can turn the industry into an exporter.

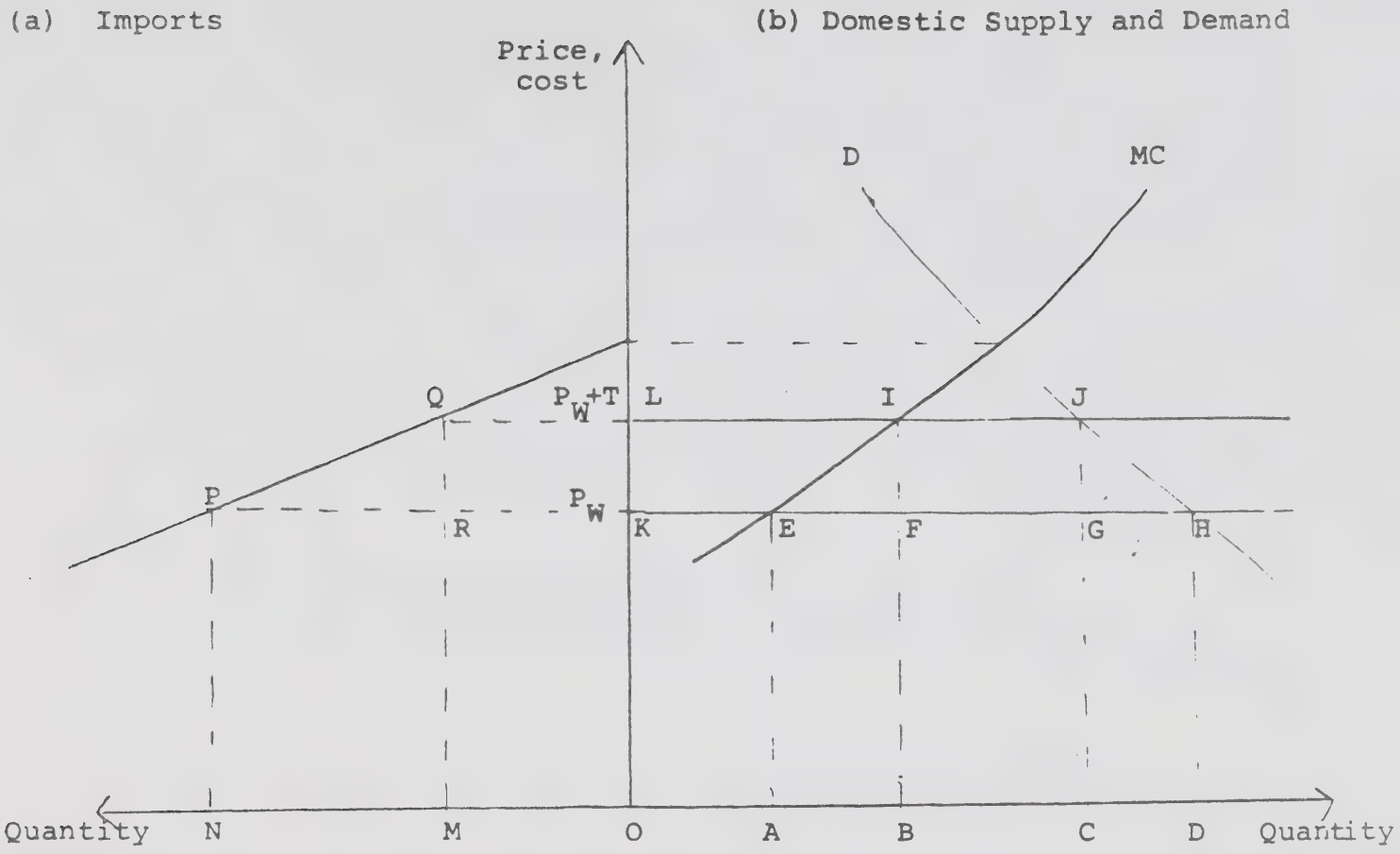

Figure 1: The Law-of-One-Price Model

The imposition of a tariff generates costs and benefits to various groups in the economy. These can be analysed with Figure 1.

Consumers lose an amount equal to the sum of the rectangle KLJG, which is the higher cash cost due to the higher price, and the 'triangle' GJH - the consumer surplus over and above the price they had paid for the CD units before imposition of the tariff.

The government gains tariff revenues equal to the rectangle IFGJ.

Domestic producers gain an amount equal to the area KLIE which is the higher profits that they earn from selling more units at a higher price.

The increased domestic output AB will also generate an increase in employment which may be, of course, the raison d'être of the tariff. The extent to which this represents a gain (or loss) depends on the opportunity cost of the labour involved.

Foreign producers presumably neither gain nor lose from the reduction in the sales to the domestic economy, since if the world market is big enough for the law-of-one-price to hold, then all producers on this market can sell as much as they like, somewhere, at price P_W. In any case, the welfare of foreign producers is rarely considered important in analyses of the effects of tariff protection.

In calculating the net welfare impact of the tariff, it is customary to value equally gains and losses to consumers, government and producers so that the various sums can be added together, and the resulting net loss (for so it turns out to be) compared with the value set on the additional jobs created, if any.

Doing this, we find that total gains or benefits (to government and producers) fall short of the losses (to consumers) by an amount equal to the two 'triangles' EIF and GJH, which thus represent the total net loss due to the tariff. These losses are the result of allocative inefficiencies induced by forcing the market price of the commodity, $P_W + T$, to differ from the opportunity cost, P_W, of purchasing it on the world market. Unnecessary domestic resources EIF are used-up in producing the extra output AB, and consumer surplus GJH is foregone.

The job gain can be calculated using information on labour/output ratios and some assumption about the marginal productivity of labour. We defer discussion of the techniques of doing this until Section IV.

(b) Implementation of the One-Price Model

The strong assumptions of the law-of-one-price model have their pay-off in the compactness with which the model can deal with equilibrium in the market for a traded good. The various allocative impacts of tariff protection, as depicted on Figure 1, can be calculated with information just on the current tariff rate, the values of imports (or exports) and of domestic output, and of the shapes (elasticities) of the marginal cost and demand curves.

Tariff and value of trade and production data can be directly observed, and are usually readily available from published statistical sources.

Elasticities are not such 'hard' data, and normally must be guessed or estimated somehow. The problem of doing this is simplified by noting that the one-price model implies that the quantity imported will be a monotonically declining function of the domestic price due to the reinforcing effects of price on demand and domestic supply.

This function is shown on the left-hand side of Figure 1. The distance NO equals the distance AD, and MO equals BC, so that the sum of the area of the two welfare loss triangles EIF and GJH equals the area of the single triangle PQR.

Thus, the welfare loss associated with a tariff T can be found with information just on the one elasticity giving the slope of the price-import line on the left-hand side of Figure 1. Econometric estimates have been made of this elasticity for various commodities (on which more in Section V).

A number of studies have used this methodology to generate estimates of the impact and costs of tariff protection. Examples are Magee (1972), for the United States; Fels and Glismann (1975), for Germany; Cline et al (1978) for the effects on a number of countries, including Canada, of the 'Tokyo round' of the GATT; and Wonnacott and Wonnacott (1967), for Canada (the last study being less comprehensively disaggregated by commodity than the others cited).

Tariffs are, in general, imposed on at least some of the inputs purchased by an industry as well as on its output. Measures of 'effective protection' attempt to quantify the effect of the total tariff structure on each commodity by plugging-in the law-of-one-price to an input-output model of the economy.

Calculations of effective protection are generally presented on a per-unit basis - that is, on the net value of tariff protection as a proportion of the unit price of each commodity - rather than as part of an attempt to use elasticities

to calculate the total sums of money involved, as in Figure 1, but there is no reason why the two approaches could not be combined within the one-price framework, with the input-output relationships used to predict the shift in the marginal cost curve, MC, that would follow elimination, say, of all tariffs.

Implementing this, more general, approach to the effects of protection would, however, entail collecting information on MC and domestic demand curves, since the short-hand method shown on the left-hand side of Figure 1 would no longer be valid.

Notable studies of rates of effective protection of Canadian-produced commodities are those by Wilkinson and Norrie (1975), and Dauphin (1978).

(c) Problems with the One-Price Model

The popularity of the one-price model is no doubt due to its relative simplicity. But the danger with simple models is that they come at the price of unrealism.

Recent research on the assumptions underlying the one-price model suggest that at least two of them are unacceptably unrealistic.

1. The assumption that the domestic economy be a price-taker for its imports is probably a reasonably valid approximation, at least for a "small" economy like Canada, for which there is some direct evidence (Appelbaum and Kohli, 1979), that it does hold.

2. The assumption that the law-of-one-price itself is valid has by now been thoroughly discredited. There are four bodies of evidence that can be produced against it:

(i) Direct comparison of Canadian and U.S. prices of the same commodities (Wonnacott and Wonnacott, 1967; Hazledine 1980d) show that, in general, there is 'water on the tariff' - that is, that Canadian prices of Canadian-produced goods are not marked up to the full value of the tariff imposed on imports from the United States.

(ii) Analysis of movements over time of price indexes in

different countries has found that prices and exchange rates do not appear to adjust, even over the long run, in such a way that the law-of-one-price could hold. Reviewing the evidence on this, Dornbusch and Jaffee concluded that it left the law-of-one-price 'rather in shambles' (1978, p.159).

(iii) Trade flows increased after the formation of the European Economic Community rather more than had been predicted from the traditional model. It was discovered that this was due to the phenomenon of 'intra-industry trade', that is, of the simultaneous occurrence of imports and exports in the same industry. (Grubel and Lloyd, 1976).

Intra-industry trade was expected at first,to be a statistical artifact due to over-aggregated data, but, in fact, turns out to persist even at quite finely disaggregated commodity classifications. The reason,which certainly accords easily with everyday experience, is that the outputs of individual sellers in a market are not, in general, perfect substitutes for each other. Buyers can distinguish between sellers on the basis of differences in the objective characteristics of commodities, and/or on 'market' differences, such as transport costs, reputation, goodwill, and so on.

In this situation of generally differentiated products, it is obviously unreasonable to maintain the

law-of-one-price assumption that each seller can sell any amount at the going price. Sellers will, in general, face downward-sloping demand curves for their output.

(iv) The last piece of evidence against the law-of-one-price comes from the body of econometric work that attempts to model the factors causing changes in domestic market prices.

It is a remarkable example of lack of communication within the discipline that economists concerned with the empirical modelling of price changes have been satisfied almost exclusively with domestic cost and market factors as explanatory variables, whereas trade economists using the law-of-one-price are thereby ruling out any domestic influence on domestic price setting.

Of course, the statistical significance of domestic variables in price regressions is, by itself, evidence against the law-of-one-price. A few studies (e.g. Calmfors and Herin (1979), for Sweden; McFetridge (1973) and Hazledine and Luck (1980) for Canada) have included both international (price of competing imports) and domestic variables in pricing equations. The result is that domestic costs retain their position as the strongest price-determining factor, while competing-import prices do sometimes show significance, at least, in the Canadian studies.

Thus, it appears that the law-of-one price is comprehensively rejected by the evidence as the model of domestic price-setting.

3. The third assumption - of increasing marginal costs - though quite prevalent at the textbook micro-theory level, is also contradicted by a substantial body of empirical work. The literature on 'employment functions' (surveyed by Hazledine, 1979b) has examined the relationship between changes in output and in employment, and typically finds strong evidence of increasing returns to the labour input (e.g., for Canada, Hazledine 1980b).

Therefore, unless there were strongly decreasing returns to the other major variable input materials (and in input-output and other studies it is generally assumed that materials-output coefficients are about constant, over the short-to-medium term), it appears to be most reasonable to assume that marginal costs are decreasing or, at least, non-increasing, with increases in output. Certainly, rather sharply upward-sloping marginal cost curves generally assumed in the literature using the one-price model (e.g., Jenkins (1980) assumes an elasticity of 1) do not seem to be empirically sustainable.

The failure of the law-of-one-price and the increasing-marginal-costs assumptions have most serious implications for the use of the one-price model as the framework for calculating the costs of tariff protection.

If perfect substitutability between imported and domestic output is dropped, then we can no longer infer, simply from knowing the size of the tariff, just what would be its effect on domestic prices. And, if marginal costs are non-increasing, then we can no longer assume that domestic output will be 'supply-determined' by the intersection of the marginal cost schedule with the price line; nor can we sort-out the distributional from the allocative effects of a change in the price received by domestic suppliers.

III. The Differentiated-Products Model: Justification

As a result of the failure of the law-of-one-price, there 'does not exist any generally agreed upon theoretical framework for the analysis of pricing behaviour', as Calmfor and Herin note.

It does seem clear that, to be empirically relevant, a pricing model should include variables representing both domestic and foreign influences, but the proper theoretical justification for such a model is not yet clear[2].

However, the transmission of foreign influences onto the domestic economy has always been a topic of particular interest in Canada, with its relative "smallness" and openness to the neighbouring large economic mass of the United States, and it can be argued, justifiably, I believe, that Canadian research has by now produced an alternative to the law-of-one-price which provides a satisfactorily realistic framework for the analysis of the effects of tariff protection.

The basic idea is due to Eastman and Stykolt (1967), who noted that the higher domestic price made possible in an industry by a tariff is a potential source of rents (higher profit margins), and asked why such rents would not be competed away by the new entrants that they should attract into the industry.

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2. Calmfors and Herin derive their estimating equation as the reduced form from the intersection of supply and demand curves, without noting that for any seller facing a downward-sloping demand curve, the orthodox supply curve relationship is not definable.

Their answer, in the spirit of the existing industrial organisation analysis of oligopoly and entry barriers in a closed-economy context (cf. Hazledine, 1979a, for a survey), was that existing domestic sellers would attempt to keep out new entrants, and that their success in so doing would depend on the degree of monopoly (level of seller concentration) in the industry, since this determines their ability to co-ordinate their action in their common interest.

Eastman and Stykolt supported their hypothesis with a number of case studies of particular industries. Bloch (1974) provided further evidence from an examination of data on Canadian/U.S. price differentials for twenty traded commodities. He split his sample into four groups, according to whether they had high or low tariff protection and high or low seller concentration levels, and found that Canadian prices tended to be significantly higher than American only in those industries which enjoyed <u>both</u> high tariff protection and high concentration levels.

More recently, the present author has used a sample of Canadian/U.S. relative prices for 33 industries as a data base on which to fit an econometric model of the pricing process (Hazledine, 1980d).

I found most statistical support for a model in which domestic price was a weighted average of domestic costs and the rate of tariff protection, with the weights depending on the

level of seller concentration, such that in relatively unconcentrated, or 'atomistic' industries, price is set simply as a markup over costs, yielding some 'normal' rate of return, while only in rather concentrated markets are the member firms able to take full advantage of the tariff.

To an economist used to the law-of-one-price, these findings may seem counter-intuitive. Surely it is 'perfect competition' that is behind the price-taking behaviour that leads to prices fully reflecting tariffs in the one-price model?

The problem is resolved when we realise that the conditions for product market competition - i.e. homogeneous products and efficient 'auctioneers' clearing markets - are simply not satisfied, as the empirical evidence cited above in Section II (c) amply demonstrates. In a world in which even very small sellers typically share a product differentiated in some dimensions from the products of all other sellers (so that even small sellers have some 'market power' in the sense of facing a downward-sloping demand curve), the engine of competition operates in the capital market ; in the process whereby firms enter into and exit from markets, and so alter the market-clearing price by altering the amount of capacity in each industry.

In an industry in which entry and exit are easy (i.e. typically one with many, small-scale, plants) any attempt by one seller to take advantage of the imposition of a tariff to raise

price above that level which would generate just normal profits will attract corrective action in the form of new sellers.

This does not imply that tariff (or other) protection has no effect on relatively 'atomistic' or 'competitive' industries but, rather, that the effect is mainly on quantity, not price. In particular, imposing a tariff on imports will raise their price relative to domestic output and so divert consumer demand to domestic suppliers.

In contrast, in highly concentrated industries, the effect of a tariff will be felt almost entirely on price and not on quantity. Since the higher landed price of competing imports will be matched by a higher domestic output price[3], relative market prices will not change, and so nor will the market shares of imports and domestic output (though the sales of both should shrink somewhat according to the industry elasticity of demand).

Thus, we have an analytical framework within which the effects of tariffs on prices and market shares can be traced through. What about costs? We might expect that high-price, high-profit firms are not able to be completely successful in securing all their monopoly profits for themselves. In particular, a high price may act as an 'umbrella' held over less efficient, higher cost firms allowing them to remain in business, whereas with more vigorous price competition, they would be forced out of the industry.

3. Though note that, in a world of differentiated products, the level of domestic prices can be above or below the level of prices of imports.

If so, we would expect to find in a protected market a distribution of average costs amongst the firms or plants belonging to the industry selling in that market.

I have data on the intra-industry distribution of costs in Canadian industries which do reveal a quite substantial degree of cost heterogeneity, and have been able to link these distributions to the 'price umbrella' concept (cf.Hazledine 1980c).

Given, in addition, the result reported in the previous section that marginal costs seem typically to be non-increasing with output, this intra-industry cost heterogeneity implies a new source of allocative inefficiency due to tariff protection. In the law-of-one-price model, production cost wastes are due to marginal units being produced at an opportunity cost higher than the price the economy need pay for the (perfectly substitutable) competing import.

In the model being developed here, this sort of waste may occur, but, in addition, there is the possibility that the tariff leads to an inefficient allocation of demand within the domestic industry, since high-cost, 'fringe', firms sheltering under the price umbrella will keep some market share that could be produced at lower cost if they were driven out, and their sales taken over by the expansion (at non-increasing marginal cost) of lower-cost domestic firms.

The lower-cost firms do not choose to compete for the output of the fringe firms, since it is worth their while to lose some market share in return for higher profit margins on their remaining output, but it would be to the benefit of the economy as a whole if they were forced to do so; say, by eliminating the tariff.

IV. The Differentiated-Products Model : Geometric Exposition

In this section we set out geometrically the model introduced in Section III, and show how it can be used to estimate the costs of creating (or saving) jobs by means of tariff protection. A full algebraic listing of the model is given in section V.

To reiterate, the key features of the view of the economy described by this model are summarized by the following assumptions:

(a) the products of competing sellers -- in particular, domestic and foreign producers -- are not, in general, perfect substitutes, and so may sell at different prices

(b) the extent to which the domestic price is affected by tariffs on imports depends (*inter alia*) on seller concentration in the domestic industry

(c) industries, in general, contain firms with a range of unit (average) costs of production

(d) all firms (in general) can expand at non-increasing marginal cost.

(1) The Impact of a Tariff

Suppose that all the plants of an industry are ranked from lowest to highest average production costs, and are laid-out on a histogram with real output on the horizontal axis. Thus, in figure 2, the width of each rectangle is the output of the plant with average costs given by the rectangle's height. With demand curve D^d_o, X_o is total industry output in period 'O' when the unit price charged by the industry is P^d_o. The profits earned per unit of output therefore range from $(P^d_o - AC_{min})$ for the lowest-cost plant, to $(P^d_o - AC_{max})$.

Suppose that a reduction in tariff protection forces a cut, DP^d, in industry price, to P^d_1. Then three of the plants of our hypothetical industry will find themselves making losses. By assumption (d), they cannot eliminate these losses by reducing output, and so, we may infer, they will be forced out of business, which would lead, in the first instance, to a contraction of the industry to the output $\bar{X}_o$ of the surviving plants.

We may expect, however, that at least some of the sales relinquished by the exiting plants will be picked-up by the survivors, which can, by assumption (d), expand output at non-increasing costs. (The remaining sales will go to increased imports.) As well, the fall in the market price

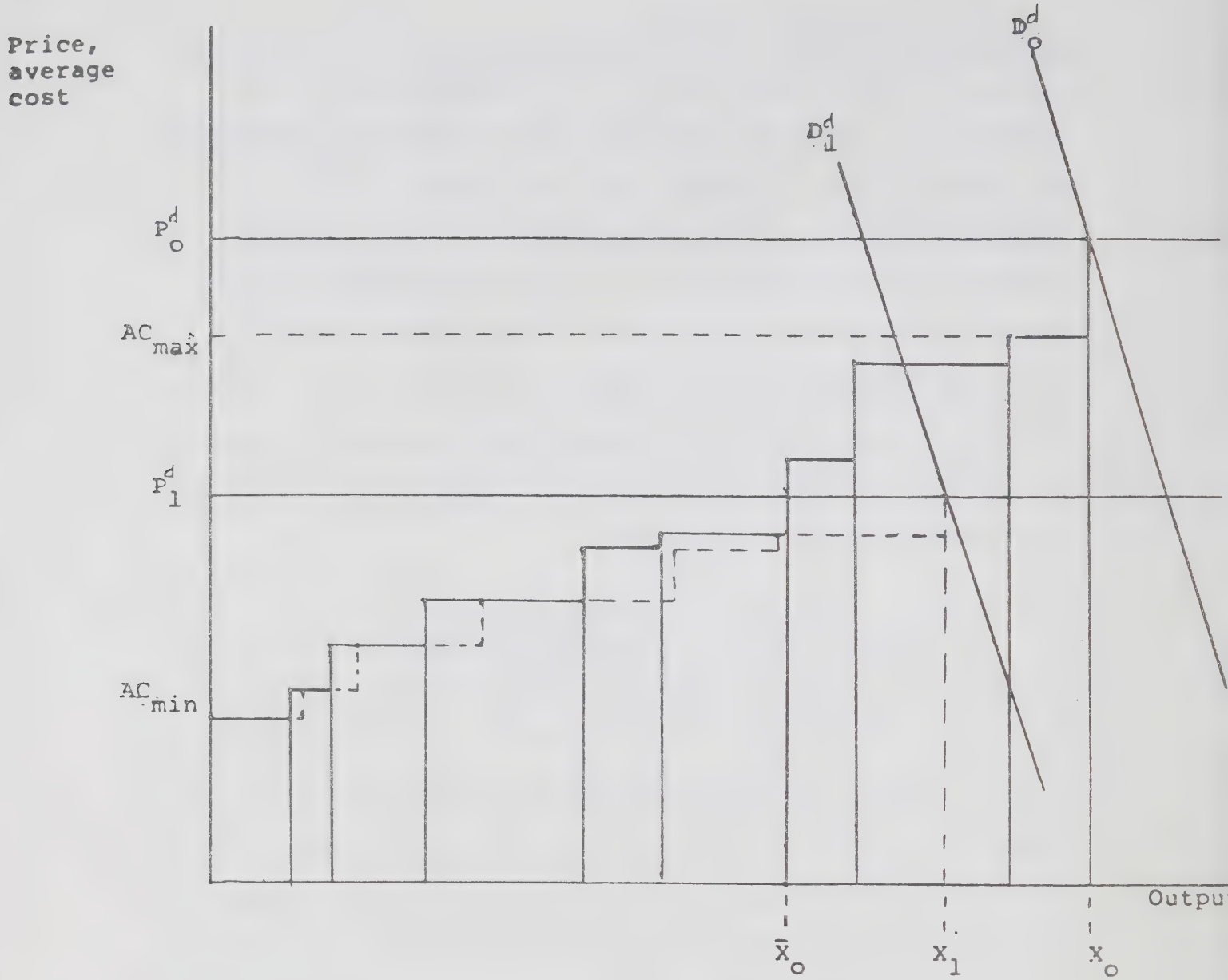

Figure 2. Effects of a Change in Price on Capacity and output

will stimulate demand. Against these effects, the relative price of imports to that of domestic output will fall (if the law-of-one price does not hold), thereby shifting some demand to imports. The net effect is the demand curve D^d_1, giving output X_1 at price P^d_1.

If we have data on the employment associated with the plants in the industry we can then estimate the net impact on jobs of the tariff protection. Note that this effect will be negative (i.e., protection reduces employment) if demand is sufficiently elastic for X_1 to be to the right of X_o.

(2) The Costs of Protection

Having calculated the effects of the tariff on employment, in each industry, we will wish to assess these effects by comparing them with the cost, if any, incurred by the use of tariffs as an employment-inducing policy instrument.

Two sorts of cost will be calculated; (a) the 'gross' costs born by consumers through higher prices paid; (b) the 'net' or 'economic' costs born by the economy as a whole due to any mis-allocations of resources induced by the tariff. In turn:

(a) Consumer Costs

Consumers suffer from tariffs through:

(i) higher prices paid for imports;

(ii) higher prices paid for competing domestic output;

(iii) loss of consumer surplus on demand discouraged by the higher prices.

These costs are illustrated on figure 3. We continue to measure the costs of tariffs as the benefits that would accrue were the present tariffs removed.

On diagram (a) of figure 3 is shown the situation for those domestic plants (producing output $\bar{X}_o$ on figure 2) which would survive the fall, $-DP^d$, in price from P^d_o to P^d_1 that would follow elimination of the tariff. The original demand curve for these plants is drawn as $\bar{D}^d_o$ [4].

As noted in sub-section (a) above, the tariff cut works in two ways on domestic demand curves:
(i) a shift inwards due to the, in general, fall in the relative price of competing imports, and (ii) an outward shift as the surviving plants pick up custom from the plants going out of business.

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4 Since plants produce different products, we should, strictly speaking, have a separate demand curve for each. However, the considerable analytical simplification that we achieve by aggregating plants should not involve any serious trade-offs with the accuracy of the analysis.

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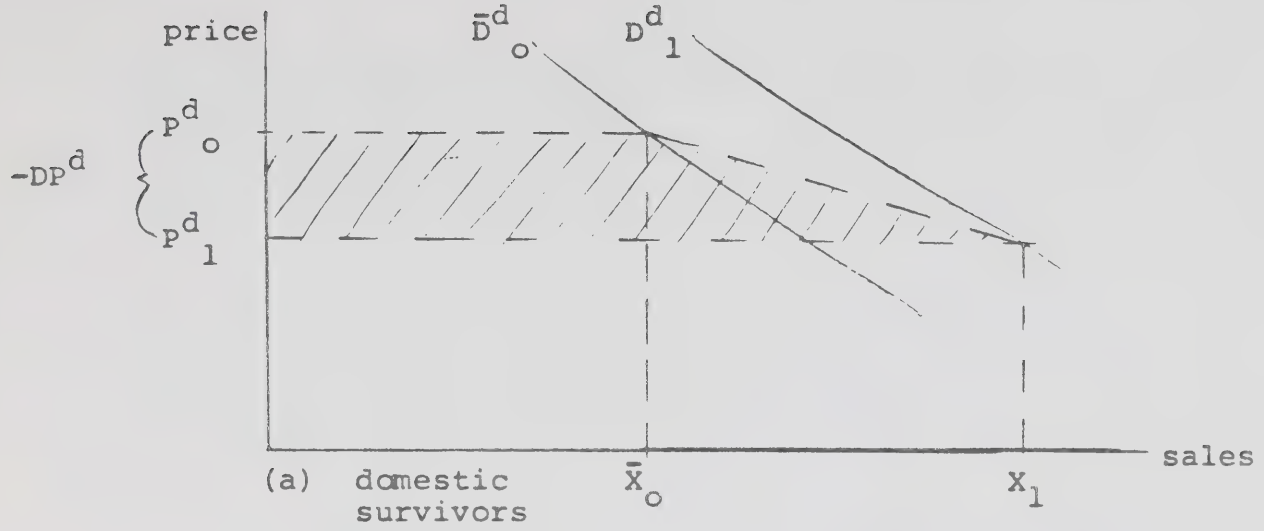
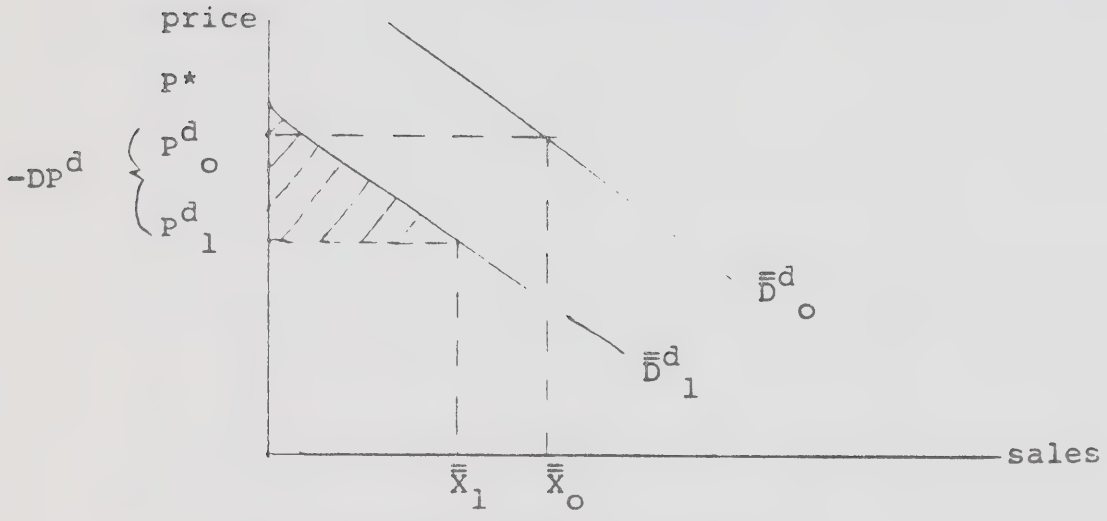
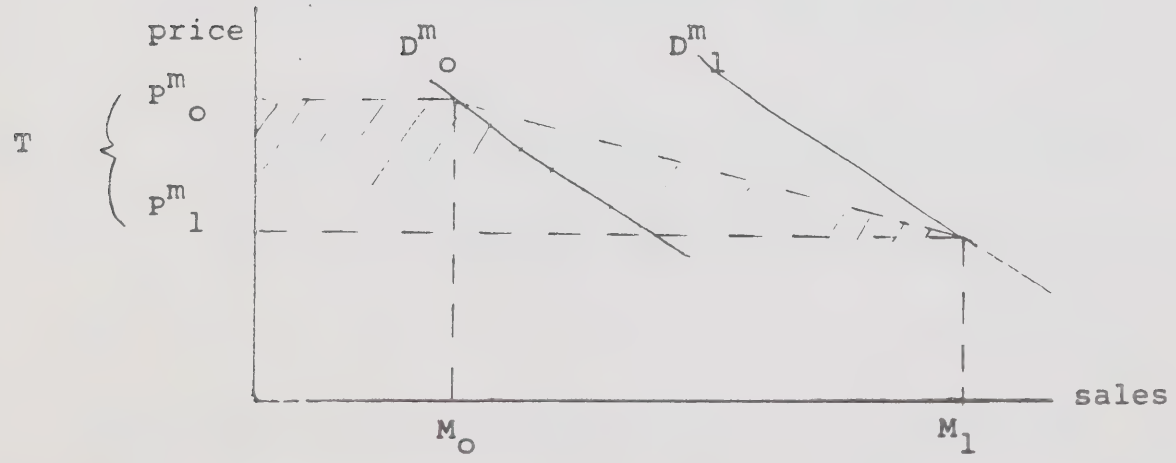




(b) exiting domestic plants



(c) imports

Figure 3. Consumer Costs of the Tariff

As with figure 2, we draw the net effect as an outward shift, to D^d_1 (though in some cases the contractionary force may dominate), and so to a new domestic output of X_1.

Harberger (1971) has shown that, in situations where demand curves shift, the effect on consumer surplus of price changes that is ascribable to a particular commodity can be approximated by an area like the shaded area on diagram (a) (see the next section for formulae).

The situation for the plants that are forced out of business by the pressure on price is drawn on diagram (b): we analyse this in two steps. First the change in relative prices shifts the demand curve facing these plants from $\bar{\bar{D}}^d_o$ to $\bar{\bar{D}}^d_1$. At 'the' new domestic price P^d_1, the potential demand is $\bar{\bar{X}}_1$. However these plants exit from the industry. From their customers' point of view, this is equivalent to a rise in price sufficiently high (eg. to P*) to discourage <u>all</u> demand.

Thus the Harberger estimate for the consumer surplus change attributable to the exiting plant is the shaded triangle.

The market for the imported commodity is represented on diagram (c) of figure 3. In this case, the effects of the relative price change and of the exit of some domestic

competitors work in the same direction, so that the demand curve definitely shifts outwards, say, to D^m_1.

Then, with the fall in price (equals the tariff, T) to P^m_1, imports will increase to M_1, and the Harberger surplus estimate will be the shaded area.

Thus, the net effect on consumer welfare[5] will be sum of the two shaded areas of diagrams (a) and (c), minus the shaded area on diagram (b).

(b) Net Economic Costs

To calculate the total net misallocative effects of tariffs, we must subtract from the net consumer costs any sums just representing transfers from consumers to other groups. As noted in Section II, this is valid on the assumption that dollars going to different domestic groups are of equal value in the policy-maker's judgement.

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5 Assuming that it is reasonable to ignore effects on the demand for commodities outside the industry

Thus we net-out tariff revenues, since these are transfers from consumers to government[6]. These equal the area of the rectangle T x M_o, on diagram (c) of figure 3.

The effect of protection on profits of domestic producers is shown on figure 4, which is a reproduction of figure 2 with the histograms of costs-per-plant smoothed into continuous lines, as is conventional practice in geometric depictions of markets[7]. AC_o is the cost distribution with the tariff, and AC_1 after the tariff's removal.

Profits lost after the fall in price are shown as the \\\ shaded area, while new profits (resulting from the expansion of output of surviving plants) are depicted shaded ///.

As drawn, the no-tariff cost line AC_1 crosses the P^d_1 line above X_1, which implies that surviving plants

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6 It could be argued that tariff revenues should not even be included in consumer costs, since in their absence, government might maintain its income by a matching increase in some other tax(es).

7 Our data will be this format. The line representation is strictly valid only if there are a very large number of plants in an industry.

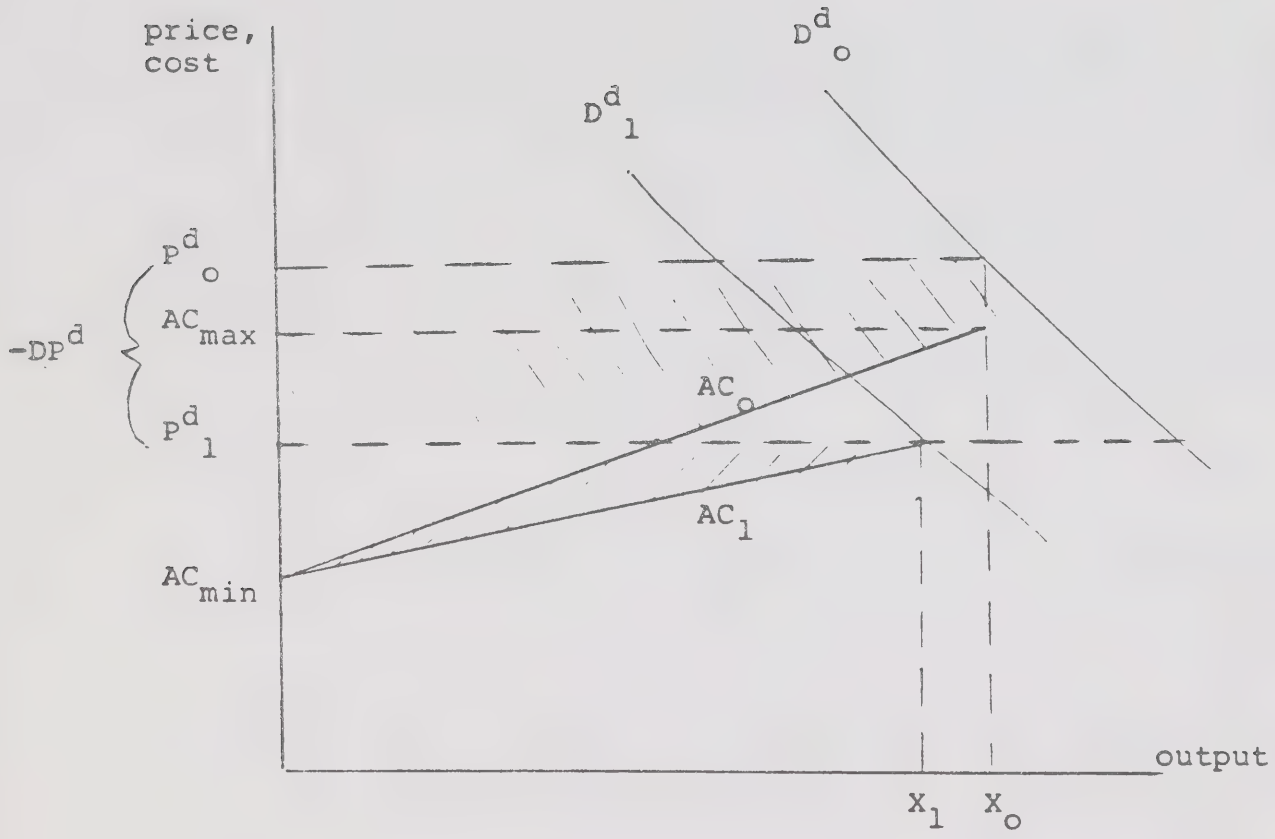

Figure 4. Producer Profits from Protection

expand at constant cost. If there are increasing returns to scale, this line will be below P^d_1 at X_1, and new profits resulting from elimination of the tariff will be greater.

Thus, to get the overall net costs of the tariffs, we should add together the shaded areas of diagrams (a) and (c) of figure 3; subtract the shaded area of diagram (b); subtract the rectangle T x M_o from diagram (c); subtract the \\\ shaded area of figure 4, and add-on the area shaded ///.

V. The Differentiated-Products Model : Implementation

In this Section we develop the specific data and formulae needed to quantify the costs of protecting employment through tariffs.

As the differentiated-products model is more complicated than the law-of-one-price, and because a special effort has been made to get actual data on costs within industries, implementation of the model is a somewhat larger undertaking than is required for estimates carried out within the one-price methodology.

The sample for the study is a set of 100 Canadian manufacturing industries. This is a subset of the 125-industry breakdown of the manufacturing sector used by the External Trade Division of Statistics in their matching of the trade commodity classification to the standard industrial classification (SIC).

The 25 omitted industries are:

(i) 'non-competing' industries (import share of domestic market less than 5%; gross tariff rate less than 10%)

(ii) 'unprotected' industries (gross tariff rate less than 5%)

(iii) industries subject to unusually large excise or sales taxes (distilleries, breweries, tobacco products, petroleum and natural gas).

The database was put together for the year 1978, which is the most recent for which Census of Manufactures data were available.

We now look in turn at the measurement or estimation of each of the variables or formulae used in the study. The actual data are given in Appendix A.

(1) Tariff Protection

For each of the 100 industries, Statistics Canada provided data on the value of total imports, the value of dutiable imports, and the value of duty paid. Imports are valued before the application of the duty; thus the 'gross tariff rate', TR, was defined:

$$TR = \frac{\text{Duty}}{\text{Dutiable and Duty}} \qquad (1)$$

-- the ratio of duty paid to the market value of dutiable imports[8]. This can be converted into the actual tariff, T, by multiplying by unit price.

---

8 It is conventional, in studies of protection, to use the ratio of duty to total import value as the measure of the tariff rate, but this will underestimate the effect on the price of those commodities which do get protection, given that some imports enter duty-free.

In some sectors, significant use is made of import quotas and other 'non-tariff barriers' (NTBs) to imports. Estimates have been made of the 'tariff-equivalent' of the NTBs (cf Jenkins, 1980, for an account of the methodology of converting NTBs to tariff-equivalents), and these added to the TR numbers from (1) for the industries affected. The derivation of the tariff-equivalents (which are shown in Appendix A) was as follows:

For clothing (0.110) and shoes (0.100), the numbers are approximate weighted averages of the figures calculated by Jenkins (1980, table 2). The textiles number (0.050) is smaller than those for clothing and footwear; it was distilled from information in various newspaper reports, and from discussions with officials of the Department of Industry, Trade, and Commerce.

The figure for shipbuilding (0.500) is in line with suggestions made to me by Dr David Sewell, of the Economic Council of Canada, who has studied this industry on behalf of the Department of Finance[9].

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9 None of the 'sources' noted here should be held at all responsible for the actual NTB estimates that I have come up with.

TR (plus any NTBs) is called a measure of the 'gross' tariff rate, since it does not measure the overall, or 'net' effect of protection on the price of materials inputs as well as output.

(2) Prices

We have noted (in Section II) that the assumption that Canada is small enough to be a 'price-taker', in its purchasing of imported goods, seems reasonable, so that market prices of imported goods will fall by the full amount of the tariff, should this be abolished:

$$DP^m = TR \times P^m_o \qquad (2)$$

However, domestic good prices, as we have noted in Sections II and III do not, in general, appear to be moved solely by the prices of the most closely competitive imports; nor to change by the same amount that import prices change.

In Hazledine (1980d) I found, after some experimentation (which included testing directly the law-of-one-price), that differences in Canadian and U.S. prices could best be explained as a weighted average of relative Canadian/U.S. costs and the rate of tariff protection.

A weakness of that paper (noted in it) was that no

variable was available to measure the degree of substitutability between domestic and imported commodities, which should surely affect the strength of the link between their prices.

For the present study, therefore, I have attempted to construct a variable for domestic/import substitutability, and have re-worked the relative price model including this as an additional explanatory variable.

The regression analysis is described in Appendix C. The price formula chosen was

$$dP_d = \left[0.979 - 4.6H\left(\frac{EX + IM}{SALES}\right)^{0.09} \right] dC + \left[4.6H\left(\frac{EX+IM}{SALES}\right)^{0.09} \right] dGT \qquad (3)$$

Equation (3) makes the proportional change in price of domestic output a weighted average of changes in domestic costs (in this case due to abolition of tariffs on material inputs) and the tariff rate on competing imports. The weights are functions of the Herfindahl index of seller concentration (H), which is believed to be related to the difficulty domestic firms have in colluding to take advantage of any tariff protection, and the ratio of the sum of exports and imports to total domestic sales, proposed as an index of the 'tradability' of the commodities produced by the industry.

Thus, the larger is the Herfindahl index, and the larger is (EX+IM)/SALES, the less weight is placed on domestic costs in domestic price-setting, and the larger the role played by competing import prices.

(3) Demand and Market Shares

Having established the changes in prices, we must predict the shifts in demand that these will cause.

In a market in which there are two commodities -- domestic 'd', and imported 'm', we write the demand for imports, M, and for domestic output, X, as functions:

$$M = f_m\ (P^m,\ P^m/P^d) \tag{4}$$

$$X = f_d\ (P^d,\ P^d/P^m) \tag{5}$$

-- demand is a function of own-price and relative price.

Taking the total derivative of (4) gives:

$$dM = f_{P^m} \cdot dP^m + f_{P^m/P^d}\ d(P^m/P^d)$$

or

$$\frac{dM}{M} = f_{P^m} \cdot \frac{P^m}{M} \cdot \frac{dP^m}{P^m} + f_{P^m/P^d} \cdot \frac{P^m/P^d}{M} \cdot \frac{d(P^m/P^d)}{P^m/P^d}$$

$$= \eta mm\ \frac{dP^m}{P^m} + \eta md\ \frac{d(P^m/P^d)}{P^m/P^d} \tag{6}$$

(6) gives the proportional change in imports as a weighted sum of the proportional changes in import price and in the relative price of imports and domestic output. The weights are the elasticity of demand with respect to a change in

import price, holding constant relative price, and the elasticity with respect to relative price, with import price held constant.

The analogous expression for domestic output is:

$$\frac{dX}{X} = \eta dd \frac{dP^d}{P^d} + \eta dm \frac{d(P^d/P^m)}{P^d/P^m} \qquad (7)$$

So, we need estimates of four elasticity parameters. ηmm and ηdd measure the response of imports and domestic output to the same event -- an equal proportional change in both prices. We have estimates (Hazledine 1980a) of 'market' price elasticities of demand -- that is, of the response of the sum of imports and domestic output to equal changes in both their prices -- and with no information to the contrary, it is probably reasonable to use the market elasticity for both the component elasticities[10].

For the relative price elasticities, we assume:

$$\eta dmX = \eta mdM \qquad (8a)$$

---

10 If, for example, imports tend to supply the 'top' (luxury) end of the market, ηmm might be larger than ηdd, with the 'market' elasticity somewhere inbetween. The 'market' elasticity estimates are not themselves very precise, though, so that the error introduced by assuming all three numbers to be the same is probably not intrusive.

-- that is, that customers who leave one source of supply as a result of a relative price change all go to the other source.

Market elasticities are taken from the CANDIDE database, and the relative price elasticity comes from the 'best' estimates for the U.S. compiled by Stern et al. (1976, p. 25), modified by the formula

$$\eta md = (\eta' md - \eta dd)(1-m) + \eta dd \qquad (8b)$$

where $\eta' md$ is the Stern figure, and m is the share of the Canadian market in 1978 taken by imports. This formula constrains the relative price elasticity to approach the market elasticity as the share of imports increases.

Thus we have all the information -- price changes and elasticities -- needed to calculate the effects on demand for imported and domestic output of a particular commodity of the elimination of the tariff on that commodity.

However, this demand is 'notional'. It will not in general be realized or 'effective', since some domestic suppliers will be forced out of business by the lower price. The method of calculating the loss of capacity is set-out in the next sub-section; here we are concerned with what

happens to the customers of the exiting firms.

First, we assume that the notional change in demand dX/X from (7) is spread evenly over all domestic plants, and so calculate the amount of sales that would be made by the exiting plants were they in fact to have remained in business.

Then these sales are split between imports and the surviving domestic capacity, in proportion to their relative market shares, modified to exclude 'non-competing' segments of the market, and to allow for a loss in domestic supply elasticity as the magnitude of the transfer in demand increases. The share, S_d, taken by domestic capacity is

$$S_d = \left(\frac{X'}{X'+M'}\right)\bar{x} \qquad (8c)$$

where X' and M' are the notional demands for domestic and imported output, and $\bar{x}$ is the proportion of 1978 capacity that would survive the tariff cut (cf. equation (12), below). The validity of (8c) will be examined in a series of case studies to follow this paper, as Appendix D.

Finally, we need a relative price elasticity from which to calculate the welfare loss due to the disappearance

of the products sold by the exiting plants (the shaded area on diagram (b) of figure 3).

Precisely because of their susceptability to competitive pressure, it is probably reasonable to assume that the elasticities of the disappearing products are rather high - that is, that good substitutes are available for them.

Without attempt at further justification, it will here be assumed that a price elasticity of (-)6 is appropriate.

(4) Costs and Capacity

Statistics Canada collect each year, in their Census of Manufactures, data on values of costs and output in each manufacturing industry, from which histograms like that illustrated in figure 2 could be computed. However, they are unable to release this information due to the confidentiality requirements of the Statistics Act.

Statistics Canada will, however, fit distribution functions to the histograms, and release the estimates of these. I had them use ordinary least squares to fit a cubic polynomial to the 1978 data for each industry, with the ratio of variable costs (materials, fuels, wages and salaries) to the value of output for each establishment (plant) matched with the cumulated output of that establishment and all the

establishments with lower cost/output ratios.

The goodness-of-fit of these polynomials was nearly always greater than 0.95, so that the cubic form appears to do a good job of approximating the underlying histogram in each industry's case.

A 'typical' distribution has approximately the shape shown as curve A on figure 5. The lowest-cost plant spends a bit less than 50 cents on variable factors to produce $1 of output, whereas the highest cost plant makes a small operating loss on its variable inputs.

The distribution tended to be steeper at either end of the cost scale. This could be due to the effects of cyclical and 'luck factors'. Each year, each plant will be affected by combinations of circumstances leading to its performance being either better or worse than its 'normal' performance, in most instances. These ups-and-downs will cancel out over several years, and are not what we wish to focus on in an examination of the extent to which the viability of plants would be threatened by a permanent elimination of tariff protection. In the middle of the unit cost rankings, we should expect to find an approximate balance of establishments having 'good' and 'bad' years. At either end, though, the distribution will be skewed -- there

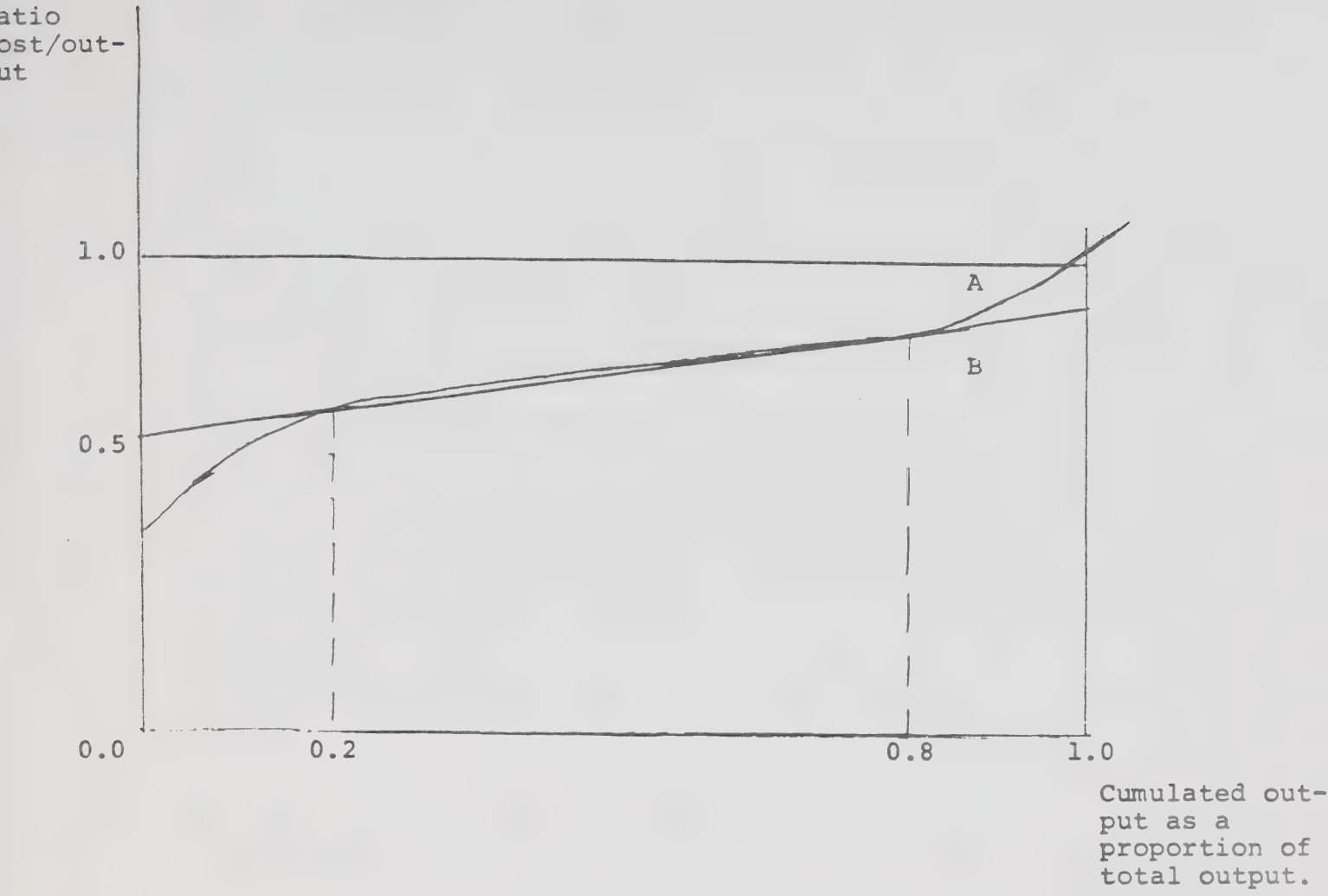

Figure 5. A Typical Cost/Output (Unit cost) Distribution

will not be many establishments having a particularly bad year turning-up on the left-hand extreme, nor good-year plants showing relatively high costs.

This inherent skewedness will tend to give the curves the shape of A in figure 5. Therefore, to get a 'longer-run' picture of each industry cost distribution, I decided to compute this as the straight line passing through the 0.2 and 0.8 points of the estimated cubic function -- line B in figure 5. The justification for doing this is elaborated in Appendix B, which also includes a comparison of 1970 and 1978 cost lines for each industry, to check on the inter-temporal stability of the cost structure.

A non-trivial further advantage of doing this is that a linear function can easily be inverted, to get the change in output that would result from a 'squeeze' in the cost/output ratio, whereas there is, in general, no analytical way of inverting a cubic.

On figure 6 is reproduced the line B from figure 5 giving the within-industry distribution of unit variable costs. Such costs are not the only relevant ones: in particular, we should wish to include in costs a measure of the services provided by capital stock. Capital stock data are not collected in the Census of Manufactures, so we cannot

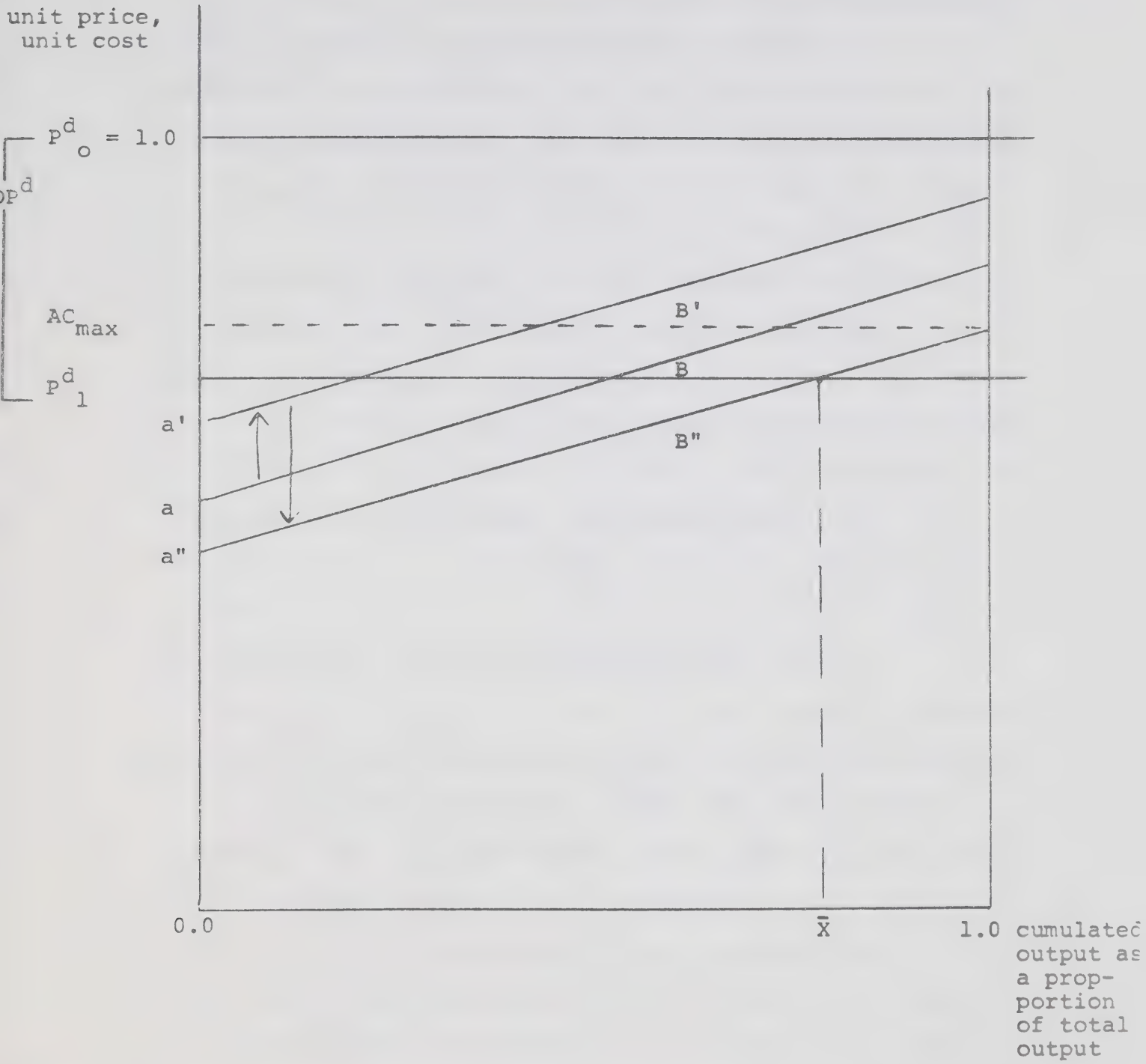

Figure 6. The Effects on Output of a Price Change

hope to have direct establishment-specific numbers incorporated in our distribution. However, capital/output ratios are available (from other Statistics Canada sources) at the industry level, and there is some evidence (Hazledine, 1980b) that, perhaps surprisingly, these do not vary much between low - and high - variable cost establishments.

Thus we simply raise the cost line throughout its length by an amount 0.16K/Y, where K/Y is the capital/output ratio and 0.16 is an estimate of the 'competitive' or 'normal' before-tax annual rate of return on capital.

The result is line B', with intercept a', where $(a' - a) = 0.16K/Y$.

Turning to the effects of tariff reductions, we should note first that the cost curve would, in general, be lowered following the removal of tariffs from the commodities which are consumed as inputs. Using their input-output table specially aggregated to the 3/4 digit SIC, Statistics Canada calculated for us the effect on each industry's input price of an across-the-board elimination of tariffs. Their calculations assumed that the law-of-one-price holds, and did not distinguish between protected and unprotected segments of each industry, in keeping with the conventional assumptions made in the theory of 'effective protection', but to make any adjustments to their algorithms would be a major

job, so that the numbers are used as calculated. Removal of tariff protection on inputs would lower each establishment's costs; we assume by an equal amount. Thus the cost distribution is moved down, to B", on Figure 6, by an amount (a' - a") equal to the value of protection on inputs.

The net effect of allowing for capital services and protection on inputs can be a line higher or lower than the original unit variable cost distribution.

Turning to the effect of tariffs on output prices, note first that on the vertical axis on which we measure the costs per dollar of output, the current price (P^d_o) of a dollar of output is, of course, one dollar. This will be reduced by removal of the tariff by an amount DP^d according to formula (2) to a tariff-free value P^d_1.

As noted in Section IV with reference to figure 2, such a decrease in price would leave some plants making losses if their unit costs were greater than P^d_1, and these will be forced to exit from the industry.

On figure 6, a proportion $(1 - \bar{x})$ of original capacity is forced out by DP^d.

All this is calculated mathematically as follows:

The formula for the average or unit cost distribution line B" is:

$$AC_i = a'' + bx_i \tag{9}$$

where b is the slope of B", and AC_i is the unit cost of the plant which, along with all lower-cost plants, accounts for a proportion x_i of total industry shipments.

Inverting (9), we get:

$$x_i = -\frac{a''}{b} + \frac{1}{b} AC_i \tag{10}$$

To find $\bar{x}$, we just substitute

$$AC_i = P^d_1 \tag{11}$$

into (10):

$$\bar{x} = -\frac{a''}{b} + \frac{1}{b} P^d_1 \tag{12}$$

That is, the proportional change in outputs due to loss of high-cost plants is $(1 - \bar{x})$, when P^d_1 is less than AC_{max}, the unit costs of the highest-cost plant, found from

$$AC_{max} = a'' + b \tag{13}$$

If P^d_1 is greater than AC_{max}, then no capacity will be forced-out.

(5) Employment

To get the employment effect of a tariff cut, we simply assume that the ratio of employees to output is the same (a) for all plants and (b) for all output rates of individual plants. The justification for Assumption (b) -- constant returns to scale -- has been discussed above. Assumption (a) was suggested by the results of having Statistics Canada fit distributions for each industry of cumulated employment against cumulated output, with the establishments ranked, as for the cost/output distributions, from lowest to highest cost/output ratios. For most industries, these distributions turned out to be very close to 45^o straight lines, implying, in particular, that there is no tendency for the highest-cost plants to use more labour per unit of gross output[11].

Then we have employment after the tariff cut given by:

$$E_1 = E_o * (X_1/X_o) \qquad (14)$$

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11 Thus their disadvantage must lie in the 'productivity' with which they process materials -- i.e., in the amount of net output, or value added, per worker.

-- a multiple of tariff-protected employment, E_o, which will be larger or smaller than E_o depending on whether the output of surviving plants, after the various adjustments, is larger or smaller than original output X_o. Thus the amount that employment would change were the tariff (and other) protection removed is:

$$DE = E_o - E_1$$
$$= E_o \, (1 - X_1/X_o) \qquad (15)$$

(6) Costs of Protection

(a) Consumer Costs

The consumer costs of protection are represented by the various shaded rectangles and triangles on the diagrams in figure 3, in Section IV. Aggregating these to net consumer costs:

$$CC = -DP^d \times \bar{X}_o - DP^d \times (X_1 - \bar{X}_o)/2$$
$$-(P^* - P^d_1) \times \bar{\bar{X}}_1/2 \qquad (16)$$
$$+T \times M_o + T \times (M_1 - M_o)/2$$

-- the sum of the shaded areas of diagrams (a) and (c) minus the shaded area of diagram (b).

(b) Net Economic Costs

As explained in Section IV, net economic costs of protection are consumer costs less tariff revenues and profits that would be lost if the protection were removed. That is:

$$EC = CC - T \times M_o$$

$$- (-DP^d \times X_o - [AC_{max} - P^d_1] \times [X_o - \bar{X}_o]/2) \qquad (17)$$

$$+ (P^d_1 - AC_{min}) \times (X_1 - \bar{X}_o)/2$$

where the second line is the\\\ shaded area, and the third line the /// shaded area, of figure 4.

(7) Costs Per Job

We will compare the economic cost estimates from (17) with the job-saved figure from (15), for each industry, by calculating the ratio:

$$EC/DE$$

-- the cost per job.

As well, the cost per dollar wage of protected jobs:

$$EC/DWAGE$$

will be calculated. DWAGE will be obtained by multiplying DE by the average annual earnings of workers in the industry, taken from the data in the Census of Manufactures[12].

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12 Valid on the assumption that wage rates in high-cost plants are on a par with those paid in the rest of the industry. Distribution functions fitted by Statistics Canada show that this assumption is close to being met, in nearly all cases.

VI Results

In this section we will refer to Appendix A, which consists of seven tables giving (a) the results of implementing the model developed in the previous section, and (b) the data on which implementation was based.

As already noted, the costs of protection were calculated for 100 Canadian manufacturing industries at the 3 or 4 digit SIC level, using data (mostly) for the year 1978. Precise sources for the database are given after Table 7.

On all the tables, the first column gives the industry SIC number for each row. As well, on Table 1, are shown the various cost data corresponding to the diagrams of Figures 5 and 6. Column 2 is the estimate of the average variable cost, as a proportion of the value of production, of the highest-cost establishment, taken from the line (B) drawn through the 0.2 and 0.8 decile points on each industry's cubic cost distribution function (line A).

The next column shows the allowance made for capital costs, obtained by multiplying each industry's capital/output ratio by 0.16 (an estimate of the 'normal' pre-tax of return). Added on to variable costs, the normal return to capital raises the cost line to B', on figure 6.

Then column 4 gives figures for that proportion of each industry's value of production that is accounted for by the inflation of prices of material inputs through the tariffs imposed on supplying industries. Subtracted from costs, these would fall to the line B" of figure 6.

The net effect of these adjustments on each industry's maximum and minimum average costs is shown in the last two columns. In some industries, the maximum values implied that the highest-cost establishments were operating at a loss. In these cases, the cost line was shifted down (slope held constant) so that its maximum value is 1, on the grounds that loss-making can only be a temporary phenomenon, leading either to an improvement in the establishments' performance, or their exit from the industry. As column 6 reveals, 24 of the 100 industries had their cost curves adjusted for this reason.

Table 2 shows rates of protection, price changes, and demand elasticities. Column 2 is the ratio of tariff duty paid to the value (including duty) of dutiable imports plus the tariff equivalents of non-tariff barriers (shown, for those industries in which they are important, in column 3).

Column 4 gives the fall in the price of domestically-produced output that would, according to equation (3), follow elimination of the tariff on competing imports. This price change is constrained so that it is not larger than the rate of

protection, which otherwise would happen in nine industries. Column 5 shows the Herfindahl index of seller concentration which enters into equation (3).

Column 6 shows the elasticity of demand for imports with respect to changes in the relative price of imports relative to domestic output in each industry. Column 7 is the total market own-price elasticity, giving the percentage change in sales of both domestic and imported output, should the prices of both of them change by one per cent. The two elasticities are related by equation (8b) in section V.

Column 2 of Table 3 gives the actual number of employees in 1978 in each industry, and the following columns show the value of shipment flows in that year -- the domestic industry's production (3), the amount of this that was exported (4), the value of imports (5), the amount of this that was subject to tariff duty, and the value of these duties (7).

The following four tables set out the effects that an across-the-board abolition of tariffs and non-tariff barriers would have on the industries, according to the model developed in the previous sections. Results are not shown for SIC industries 2960 (aluminum rolling, etc.) and 3280/3290 (boat building and repairs/miscellaneous vehicles) in which, for some as yet unresolved reason, the data show exports to be larger than domestic production.

Column 2 of Table 4 gives the change in imports. Since, in each industry, the price of imports is lower without the tariff, and its price relative to domestic output in the same industry either falls or is unchanged, imports increase in every instance, according to equation (6).

For domestic output (column 3), however, the pattern of demand changes is mixed, since the own-price and cross-price effects work against each other. In most cases, though, the fall in domestic prices is sufficient to outweigh the substitution effect of their rise against import prices.

Both columns 2 and 3 give 'notional' demands, that is, the initial response of consumers to the price changes. However, as set out in equations (9) thru (13), the fall in domestic output price has another effect: if it results in a new price level that is below the average costs of the highest-cost establishments in an industry, it will force these establishments to leave the industry.

Column 4 shows the value of 1978 production that would be squeezed out in each industry. In 58 of the industries some squeezing-out will occur, and in two of these -- SICs 1810 (cotton yarn and cloth) and 2970 (copper rolling, etc.) -- the fall in price is sufficient to wipe-out the domestic industry (the new price is below the costs of the lowest-cost establishment). In many others of the 58 the loss of capacity would be severe, as comparison of these numbers with the 1978 value of production data on Table 3 shows.

Columns 5 and 6 (of Table 4) show the split of exiting establishments' customers between imports and surviving domestic capacity according to the formula of equation 8c.[14] In most cases, the bulk of sales remain in the domestic industry, reflecting the fact that imports take the minority share in most markets.

The last column of Table 4 reveals the net effect on domestic production of elimination of the tariff. It is found by subtracting from column 3 (the 'notional' demand change), column 5 (that part of notional demand that ends up going to imports because some domestic capacity is forced out by the lower prices). In 42 of the 98 industries for which results are given the net effect of the tariff reduction is positive. In these industries there is a positive notional demand effect, due to the lower prices, that is sufficient to outweigh any loss of sales due to loss of capacity.

In the other 56 industries, the notional demand effect of the price changes either is negative, or, if positive, is not large enough to compensate for the losses in high-cost capacity.

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14 Columns 5 and 6 do not sum to the (absolute) value of column 4 because of the changes in the notional demand for the output of exiting establishments.

The results highlight the unevenness of a tariff's incidence on its industry. In most (though not all) cases the tariff does effectively 'protect' the highest-cost establishments of the industry, when these would be forced out without it. But, in all such cases, the protection hinders the lower-cost establishments from expanding; in 42 of the industries such expansion, along with the stimulative effect of lower prices on demand, would be sufficient actually to increase domestic production and employment.

These findings contrast with those that would be generated by a law-of-one-price model (figure 1) in which all domestic output is supply-determined, so that production takes place up to the point where (increasing) marginal costs equal price. Under these assumptions, a cut in domestic price would always result in a reduction of domestic output, which would, however, be spread amongst all the establishments in the industry (since all establishments supposedly equate marginal costs to price). Either no plants would close, or they all would.[15]

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15 All plants would close if the new price were less than minimum average costs of the lowest-cost establishment. Since, in the one-price model, the price change equals the tariff rate, which is, in general, larger than the price change given by the model used here, complete wiping-out of the domestic industry would occur more often under the law-of-one-price assumptions than it does in our results.

Tables 5 and 6 set out the rents associated with tariff protection, and the net economic costs that they imply. Columns 2, 3, and 4 of Table 5 measure the three consumer-rent effects of eliminating the tariff, corresponding to the shaded areas on diagrams (c), (a), and (b) of figure 3. Consumers would gain from lower prices for imports and domestic goods, but would suffer, in a world of differentiated products, from the loss in variety consequent to losing some (high-cost) domestic suppliers.

The three consumer rents are summed in column 5. In two industries (SICs 2710, 2970) consumers suffer sufficiently from the loss of domestic suppliers for this to outweigh their gains from lower prices; since the elasticity figure (-6.0) used to calculate the welfare losses from losing suppliers is arbitrary, not a lot of precision can be attached to our estimates of these losses, however, it does seem reasonable to add a concern for the disruptive effects on consumers of structural changes following loss of protection to the concern traditionally expressed for the disruptions imposed on factors of production (especially labour); even if, as in the latter case, most or all of the consumer costs would turn out to be temporary ('adjustment costs').

The last column of Table 5 repeats the listing of tariff revenues from Table 3; these are government's rents from protection.[16]

In Table 6, columns 2 and 3 show, respectively, the profits made, in 1978, by those establishments (if any) that would be forced out by elimination of protection, and the difference between the 1978 profits of the remaining establishments that are due to tariff-effects on prices, and the extra profits that they would earn by being able to expand (at constant marginal cost) into the 'gap' left by the forced-out establishments (cf. figure 4).

In nine cases, the extra profits from expansion actually more than make up for the lower profit margins on all output, so that the lower-cost portion of the industry would actually gain, in profit terms, from elimination of the tariff. In four of these industries, the profit gain would even compensate for the lost profits of forced-out establishments, so that the industry as a whole is less profitable because of the tariff.

Column 5 gives the net costs ('waste') of protection by subtracting from the consumer costs the rents accruing to government and producers. In all but seven industries, the net costs are positive, implying that the benefits accruing to some group(s) are less than the costs imposed on others. The difference

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16 Included are implicit rents from non-tariff barriers. In some cases these may, in fact, be captured by the domestic industry, or even by overseas suppliers (cf. Jenkins, 1980).

is due (a) to the 'deadweight welfare loss triangles' suffered by consumers paying more than the marginal social costs of goods (cf. figure 4), and (b) to the domestic production of some output that could either be bought more cheaply from foreign suppliers, or produced more cheaply by other Canadian establishments. The higher domestic production costs due to protection are listed in column 7.

In the other seven industries, these costs are outweighed by the loss in consumer welfare associated with losing the goods produced by exiting establishments.

On Table 7, we show the employment effects of protection, and then relate these to the cost-of-protection numbers from Table 6 to generate our final summary of the costs of using trade barriers to protect domestic employment.

Column 4 gives the net change in employment (from equation 15), and the preceding two columns disaggregate this into high-cost and low-cost components. We find that employment expands, in most cases, in the 'low-cost' (surviving) segments of industries after protection is removed; and that, in 41 industries, the low-cost expansion is sufficient to outweigh the job losses associated with forced-out high-cost establishments (if any).

Thus, on the simplest of 'jobs-saved' criteria, the tariff is unsuccessful in these 41 industries,[17] and since, in all

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17 Which does not necessarily imply that protection is not in the interests of the owners of these industries: this depends on the profitability effect (Table 6).

of them, net economic costs of protection (Table 6) are found to be positive, we are not, in these instances, able to find any evidence to justify the protection on economic grounds.

In the other fifty-seven industries, the tariff does, it seems, save some jobs. In seven of these the net economic cost is negative, implying that protection has a beneficial impact on both employment and overall economic welfare.[18]

In fifty industries, then, there is a trade-off: workers' jobs are protected, but at a cost to the rest of the economy. Column 7 shows this (annual) cost as a ratio of the annual wages paid to protected workers (calculated on the assumption that all establishments in an industry pay the same (wages). That is, it gives the cost of protecting a dollar of wages.

This ratio shows a good deal of variation. Not surprisingly, those industries which are most 'heavily' protected, in the sense of the proportion of their jobs depending on the tariff, tend to have low or negative costs per job, as the wastes associated with protection are spread over more jobs (and because the area of the loss-of-variety triangle, figure 3(b), increases more than proportionally with the amount of exiting capacity).

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18 Though bear in mind that these negative cost numbers are due to the size of the welfare loss associated with loss of consumer choice when establishments exit, and that the latter was calculated with an arbitrary elasticity coefficient.

On the other hand, industries in which protection actually nets-out to rather few jobs saved tend to get these at a high unit cost. The most extravagant tariff is that imposed on asphalt roofing (SIC 2720), which results in just one job saved at a cost of $1.7 million.

In 34 industries, the cost/wage ratio exceeds one, often considerably. In these industries it would appear to be economically efficient to remove protection and pay the displaced workers their full wages for not working at all, if necessary.

This completes the presentation of the numerical findings of this study. In the next, concluding, section, an attempt will be made to assess the use that could be made of these findings, given the many qualifications and caveats that are appropriate. As well, the industries showing the largest costs of protection will be investigated further, case-by-case, in Appendix D.

VII Conclusions and Caveats

For each of one hundred Canadian manufacturing industries, we have worked through a model predicting the effects that elimination of tariff protection would have on Canadian output and employment.

The results are very diverse. Depending on market and cost conditions in each industry, a given tariff rate may have a quite different impact in different industries. In some industries the tariff appears to reduce total employment, by restricting demand through higher prices. In other industries the main impact is not on employment, but on 'rents' -- on the distribution of income between consumers and capitalists. In industries in which the tariff does seem to protect jobs, it does so at widely differing economic cost. It is strikingly clear that inter-industry differences in tariff rates are considerably less than inter-industry differences in the magnitude of their effects.

One must ask whether this heterogeneous pattern of the tariff structure's incidence on the Canadian economy is desirable, or, even, desired by the policy-makers themselves. This is not the place to go into the political economy of tariff policy; however, our findings do seem consistent with a world in which tariffs are aimed, in general, at rather small groups of firms within industries,

in a manner which, though economically haphazard, may be politically expedient. As a result, the tariff structure seems to have generated considerable inefficiency, so that it should be possible, even without questioning the presumed protective aim of tariffs, to devise alternative policies which would 'save' the same number of jobs at significantly lower cost.

This said, a number of limitations of the present analysis should be noted. The reader may well be able to add to this list. I do not, however, believe it likely that extending and refining the analysis would transform the chaotic world of uneven tariff incidence unveiled here into an orderly scene of economic rationality.

The caveats are

(1) Data. The numbers used in this study range, in descending order of reliability, from the industry-level data on employment, output and trade, through the intra-industry cost data and the demand elasticities, to the formulae for pricing behaviour and shifts in market shares.

Data weaknesses are always a problem with large-scale quantitative analysis, and are not alleviated by the common practice of printing out calculations to many decimal points. It is true that the law-of-one-price model is somewhat less demanding in its data requirements; but since the one-price model appears to be fundamentally wrong, its relative simplicity of implementation is hardly a useful point in its favour.

The database assembled for this study does make use of some novel sources of information; in particular, the intra-industry cost distributions, and the background econometric research on domestic pricing behaviour. We can expect that these will have increased the realism of the empirical results over that of previous work on this topic, but it cannot be doubted that accuracy would be significantly further improved by case study investigations of particularly important or interesting industries, and this is done in Appendix D.

(2) The scope of the analysis is limited to the 'short-term' impact of tariff-elimination; it assumes that the structure of each industry does not respond to changes in protection. In fact, though, tariffs affect profitability and competitive pressures in industries, and therefore may work through to long-term or 'dynamic' changes in investment, scale economies and technical change. Less protection may lead to reductions in 'X-inefficiency'; on the other hand, the loss of protection in the domestic market may reduce the ability of firms to gear-up for exporting. All these factors may be of considerable importance, and are therefore worthy topics for further research.

(3) The analysis is partial - valid, in principle, for each industry, but not for all of them, since an across-the-board tariff cut would increase total imports, and thus force a currency depreciation to restore the balance of payments. The result would be that all industries would tend to export more, and that some

(those with the lowest tariff protection before the cuts) would end up effectively more protected than before, due to the lower exchange rate.

To sort-out all this we would need to add to the model of imports and domestic production presented in this paper some explanation of industries' exporting behaviour, and would require a general equilibrium algorithm to tie it all together.

(4) The study pays no heed to the opportunity costs of the capital and labour protected by tariffs. This does not make the results wrong as far as they go, but it does mean that we cannot evaluate the costs per job-saved numbers without knowing something about the value of the alternatives to which protected capital and labour would otherwise turn, and about the adjustment costs involved in effecting the reallocation of these resources. Other studies being undertaken for the Taskforce will address these issues.

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TABLE 1: INDUSTRY COST STRUCTURE DATA

	1 SIC	2 MAXIMUM AVERAGE VARIABLE COST	3 NORMAL RETURN ON CAPITAL	4 INCREASE IN INPUT COSTS DUE TO TARIFFS	5 MAXIMUM AV.TOTAL COST (NO TARIFFS)	6 MINIMUM AV.TOTAL COST (NO TARIFFS)
1	1012.	0.920	0.018	0.027	0.911	0.819
2	1020.	1.000	0.057	0.021	1.000	0.655
3	1040.	1.023	0.043	0.032	1.000	0.687
4	1081.	0.883	0.073	0.044	0.912	0.530
5	1083.	0.997	0.029	0.027	1.000.	0.875
6	1089.	0.977	0.056	0.045	0.988	0.541
7	1091.	1.044	0.077	0.051	1.000	0.397
8	1094.	0.756	0.108	0.059	0.805	0.655
9	1620.	0.845	0.112	0.046	0.911	0.783
10	1650.	0.955	0.040	0.049	0.946	0.483
11	1720.	0.933	0.053	0.034	0.953	0.791
12	1740.	0.909	0.026	0.056	0.879	0.666
13	1750.	0.927	0.019	0.046	0.900	0.705
14	1790.	0.920	0.055	0.060	0.914	0.541
15	1810.	0.928	0.114	0.058	0.984	0.869
16	1820.	1.112	0.003	0.054	1.000	0.342
17	1830.	1.007	0.132	0.073	1.000	0.637
18	1840.	0.888	0.126	0.061	0.954	0.787
19	1851.	1.146	0.086	0.073	1.000	0.308
20	1852.	1.045	0.109	0.054	1.000	0.587
21	1860.	1.004	0.051	0.089	0.966	0.689
22	1891.	0.972	0.070	0.071	0.972	0.638
23	1892.	1.003	0.064	0.058	1.000	0.572
24	1880,1899	0.918	0.071	0.073	0.916	0.607
25	2310.	0.943	0.071	0.072	0.942	0.650
26	2390.	0.913	0.059	0.088	0.885	0.663
27	2430.	0.948	0.017	0.077	0.888	0.560
28	2440.	0.922	0.012	0.077	0.857	0.557
29	2450.	0.944	0.015	0.077	0.883	0.599
30	2460.	0.985	0.011	0.077	0.919	0.411
31	2480.	0.959	0.034	0.077	0.916	0.664
32	2450.	0.863	0.035	0.077	0.822	0.655
33	2510.	0.935	0.059	0.016	0.978	0.595
34	2520.	0.876	0.051	0.031	0.896	0.706
35	2540.	0.876	0.051	0.035	0.893	0.476
36	2560.	0.904	0.040	0.036	0.908	0.631
37	2580.	0.875	0.040	0.043	0.872	0.712
38	2590.	0.962	0.096	0.028	1.000	0.667
39	2610.	0.869	0.032	0.057	0.844	0.609
40	2640.	0.881	0.043	0.057	0.867	0.515
41	2660.	0.907	0.023	0.060	0.870	0.488
42	2680.	0.931	0.016	0.064	0.883	0.513
43	2710.	0.870	0.281	0.037	1.000	0.792
44	2720.	0.907	0.076	0.048	0.936	0.679
45	2730.	0.884	0.059	0.061	0.882	0.740
46	2740.	0.925	0.057	0.068	0.914	0.624
47	2870.	0.844	0.071	0.033	0.881	0.508
48	2860,80,90	0.956	0.077	0.042	0.991	0.491
49	2910.	0.830	0.150	0.025	0.955	0.864
50	2920.	0.929	0.094	0.058	0.965	0.772

51	2940.	0.893	0.073	0.028	0.938	0.681
52	2950.	0.803	0.186	0.060	0.929	0.741
53	2960.	1.194	0.081	0.031	1.000	0.528
54	2970.	0.905	0.035	0.014	0.926	0.921
55	2980.	1.055	0.043	0.025	1.000	0.553
56	3010.	0.994	0.031	0.044	0.980	0.548
57	3020.	1.066	0.051	0.046	1.000	0.450
58	3030.	0.936	0.046	0.047	0.935	0.494
59	3040.	0.928	0.055	0.048	0.935	0.568
60	3050.	0.960	0.056	0.047	0.969	0.569
61	3060.	0.860	0.055	0.039	0.876	0.542
62	3070.	0.974	0.061	0.060	0.975	0.541
63	3090.	0.917	0.054	0.048	0.923	0.573
64	3150.	0.905	0.042	0.047	0.900	0.584
65	3160.	0.969	0.027	0.055	0.941	0.673
66	3180.	1.334	0.051	-0.237	1.000	0.250
67	3210.	0.829	0.073	0.035	0.867	0.655
68	3240.	0.976	0.036	0.054	0.958	0.695
69	3260.	0.990	0.057	0.054	0.993	0.713
70	3270.	1.308	0.056	0.040	1.000	0.132
71	3280.	0.911	0.057	0.042	0.926	0.793
72	3310.	1.023	0.030	0.056	0.998	0.583
73	3320.	0.947	0.028	0.065	0.910	0.632
74	3330.	1.005	0.047	0.060	0.992	0.525
75	3340.	0.805	0.023	0.063	0.765	0.543
76	3350.	0.942	0.047	0.045	0.943	0.593
77	3360.	1.000	0.058	0.048	1.000	0.590
78	3380,90	1.073	0.052	0.048	1.000	0.562
79	3391.	0.969	0.042	0.043	0.968	0.563
80	3399.	0.913	0.080	0.057	0.936	0.598
81	3510.	0.894	0.129	0.040	0.983	0.567
82	3530.	0.916	0.104	0.033	0.987	0.637
83	3540.	0.877	0.102	0.030	0.949	0.458
84	3560.	0.744	0.145	0.040	0.849	0.716
85	3570.	1.196	0.088	0.042	1.000	0.313
86	3591.	1.068	0.065	0.030	1.000	0.542
87	3599.	0.857	0.091	0.038	0.909	0.621
88	3730.	0.943	0.103	0.049	0.997	0.809
89	3740.	0.719	0.062	0.045	0.736	0.439
90	3750.	0.838	0.048	0.049	0.836	0.495
91	3770.	0.653	0.029	0.053	0.628	0.478
92	3780.	0.952	0.243	0.040	1.000	0.688
93	3790.	0.981	0.067	0.045	1.000	0.417
94	3910.	1.195	0.054	0.047	1.000	0.283
95	3920.	1.087	0.011	0.028	1.000	0.478
96	3930.	0.998	0.022	0.054	0.966	0.466
97	3970.	1.098	0.045	0.041	1.000	0.600
98	3991.	0.950	0.052	0.055	0.948	0.641
99	3993.	0.931	0.050	0.069	0.911	0.711
100	3992.	0.929	0.050	0.045	0.933	0.400

TABLE 2: INDUSTRY DATA ON PROTECTION AND DEMAND ELASTICITIES

	1 SIC	2 RATE OF PROTECTION (INCL. NTBS)	3 TARIFF-EQUIVALENT OF NON-TARIFF BARRIERS	4 PROP'N CHANGE IN PRICE AFTER REMOVAL OF PROTECTION	5 HERFINDAHL INDEX OF SELLER CONCENTRATION	6 PRICE ELASTICITY OF DEMAND (IMPORTS)	7 PRICE ELASTICITY OF DEMAND (TOTAL MARKET)
1	1012.	0.092	0.0	-0.038	0.050	-1.08	-0.50
2	1020.	0.099	0.0	-0.047	0.074	-1.01	-0.50
3	1040.	0.040	0.0	-0.033	0.052	-1.09	-0.50
4	1081.	0.128	0.0	-0.075	0.094	-1.01	-0.50
5	1083.	0.096	0.0	-0.082	0.186	-1.03	-0.50
6	1089.	0.057	0.0	-0.047	0.063	-1.05	-0.50
7	1091.	0.097	0.0	-0.064	0.098	-1.59	-0.50
8	1094.	0.118	0.0	-0.098	0.157	-1.54	-0.50
9	1620.	0.155	0.0	-0.084	0.087	-4.24	-0.75
10	1650.	0.146	0.0	-0.052	0.010	-2.27	-0.75
11	1720.	0.092	0.0	-0.077	0.176	-1.33	-0.75
12	1740.	0.298	0.100	-0.083	0.027	-1.88	-0.75
13	1750.	0.179	0.0	-0.086	0.072	-1.27	-0.75
14	1790.	0.139	0.0	-0.074	0.045	-1.32	-0.75
15	1810.	0.207	0.050	-0.207	0.300	-1.01	-0.75
16	1820.	0.198	0.050	-0.091	0.065	-1.00	-0.75
17	1830.	0.218	0.050	-0.165	0.150	-0.98	-0.75
18	1840.	0.198	0.050	-0.160	0.165	-0.98	-0.75
19	1851.	0.165	0.050	-0.121	0.119	-0.98	-0.75
20	1852.	0.183	0.050	-0.138	0.173	-1.08	-0.75
21	1860.	0.235	0.050	-0.128	0.070	-1.06	-0.75
22	1891.	0.194	0.050	-0.175	0.217	-1.03	-0.75
23	1892.	0.235	0.050	-0.121	0.090	-1.02	-0.75
24	1880,1899	0.233	0.050	-0.136	0.101	-1.04	-0.75
25	2310.	0.294	0.110	-0.100	0.035	-1.06	-0.75
26	2390.	0.325	0.110	-0.116	0.030	-0.98	-0.75
27	2430.	0.302	0.110	-0.084	0.010	-3.64	-0.75
28	2440.	0.304	0.110	-0.080	0.005	-3.61	-0.75
29	2450.	0.305	0.110	-0.091	0.018	-3.57	-0.75
30	2460.	0.020	0.0	-0.020	0.031	-3.02	-0.75
31	2480.	0.242	0.030	-0.146	0.122	-3.78	-0.75
32	2450.	0.287	0.110	-0.147	0.080	-2.93	-0.75
33	2510.	0.114	0.0	-0.023	0.017	-1.00	-0.75
34	2520.	0.118	0.0	-0.058	0.074	-0.97	-0.75
35	2540.	0.121	0.0	-0.044	0.030	-0.99	-0.75
36	2560.	0.124	0.0	-0.058	0.074	-0.99	-0.75
37	2580.	0.132	0.0	-0.068	0.073	-0.96	-0.75
38	2590.	0.128	0.0	-0.099	0.160	-0.96	-0.75
39	2610.	0.161	0.0	-0.060	0.010	-2.69	-1.00
40	2640.	0.151	0.0	-0.075	0.048	-2.83	-1.00
41	2660.	0.148	0.0	-0.065	0.018	-2.81	-1.00
42	2680.	0.144	0.0	-0.076	0.045	-2.87	-1.00
43	2710.	0.120	0.0	-0.053	0.044	-1.26	-0.75
44	2720.	0.131	0.0	-0.131	0.255	-1.29	-0.75
45	2730.	0.142	0.0	-0.079	0.070	-1.28	-0.75
46	2740.	0.138	0.0	-0.079	0.043	-1.21	-0.75
47	2870.	0.133	0.0	-0.037	0.014	-2.86	-1.00
48	2860,8[illegible],90	0.129	0.0	-0.057	0.045	-2.89	-1.00
49	2910.	0.083	0.0	-0.072	0.194	-1.30	-0.50
50	2920.	0.105	0.0	-0.104	0.233	-1.20	-0.50

51	2940.	0.105	0.0	-0.061	0.100	-1.28	-0.50
52	2950.	0.069	0.0	-0.067	0.212	-1.37	-0.50
53	2960.	0.055	0.0	-0.030	0.400	-2.69	-0.50
54	2970.	0.081	0.0	-0.081	0.262	-1.31	-0.50
55	2980.	0.113	0.0	-0.051	0.071	-1.37	-0.50
56	3010.	0.129	0.0	-0.078	0.103	-3.39	-0.75
57	3020.	0.137	0.0	-0.066	0.076	-3.57	-0.75
58	3030.	0.142	0.0	-0.057	0.030	-3.50	-0.75
59	3040.	0.140	0.0	-0.064	0.050	-3.44	-0.75
60	3050.	0.120	0.0	-0.074	0.088	-3.16	-0.75
61	3060.	0.138	0.0	-0.045	0.016	-2.57	-0.75
62	3070.	0.159	0.0	-0.159	0.357	-3.31	-0.75
63	3090.	0.135	0.0	-0.051	0.012	-2.76	-0.75
64	3150.	0.120	0.0	-0.049	0.009	-1.00	-1.00
65	3160.	0.124	0.0	-0.088	0.111	-1.00	-1.00
66	3180.	0.108	0.0	-0.108	0.287	-1.00	-1.00
67	3210.	0.134	0.0	-0.082	0.105	-3.29	-0.75
68	3240.	0.147	0.0	-0.081	0.080	-3.12	-0.75
69	3260.	0.141	0.0	-0.124	0.193	-2.87	-0.75
70	3270.	0.678	0.500	-0.412	0.137	-3.28	-0.75
71	3280,3290	0.125	0.0	-0.125	0.300	-0.35	-0.75
72	3310.	0.141	0.0	-0.081	0.071	-0.88	-0.75
73	3320.	0.151	0.0	-0.103	0.111	-0.94	-0.75
74	3330.	0.149	0.0	-0.089	0.080	-0.93	-0.75
75	3340.	0.123	0.0	-0.094	0.115	-0.79	-0.75
76	3350.	0.135	0.0	-0.128	0.210	-0.92	-0.75
77	3360.	0.135	0.0	-0.079	0.087	-0.92	-0.75
78	3380.	0.141	0.0	-0.114	0.188	-0.99	-0.75
79	3391.	0.147	0.0	-0.119	0.176	-0.95	-0.75
80	3399.	0.141	0.0	-0.097	0.113	-0.93	-0.75
81	3510.	0.147	0.0	-0.090	0.110	-2.22	-0.75
82	3530.	0.132	0.0	-0.043	0.027	-2.62	-0.75
83	3540.	0.097	0.0	-0.042	0.060	-2.00	-0.75
84	3560.	0.107	0.0	-0.107	0.250	-1.39	-0.75
85	3570.	0.141	0.0	-0.141	0.279	-1.57	-0.75
86	3591.	0.114	0.0	-0.114	0.239	-1.71	-0.75
87	3599.	0.127	0.0	-0.076	0.108	-1.90	-0.75
88	3730.	0.106	0.0	-0.074	0.101	-1.75	-0.75
89	3740.	0.092	0.0	-0.051	0.035	-2.23	-0.75
90	3750.	0.129	0.0	-0.064	0.051	-2.31	-0.75
91	3770.	0.121	0.0	-0.073	0.079	-2.18	-0.75
92	3780.	0.110	0.0	-0.071	0.100	-1.98	-0.75
93	3790.	0.121	0.0	-0.064	0.060	-2.04	-0.75
94	3910.	0.116	0.0	-0.096	0.160	-1.38	-0.75
95	3920.	0.176	0.0	-0.071	0.071	-1.95	-0.75
96	3930.	0.144	0.0	-0.089	0.090	-1.46	-0.75
97	3970.	0.151	0.0	-0.047	0.017	-2.01	-0.75
98	3991.	0.158	0.0	-0.079	0.061	-1.85	-0.75
99	3993.	0.173	0.0	-0.121	0.117	-1.45	-0.75
100	3992.	0.134	0.0	-0.091	0.120	-1.43	-0.75

TABLE 3: INDUSTRY DATA ON EMPLOYMENT AND SHIPMENTS WITH PROTECTION

	1 SIC	2 NUMBER OF EMPLOYEES 1978	3 VALUE OF PRODUCTION* 1978 ($MILLIONS)	4 VALUE OF EXPORTS# 1978 ($MILLIONS)	5 VALUE OF ALL IMPORTS 1978 ($MILLIONS)	6 VALUE OF DUTIABLE IMPORTS 1978 ($MILLIONS)	7 VALUE OF TARIFF DUTIES 1978 ($MILLIONS)
1	1012.	9432.	809.1	3.3	28.6	24.7	2.5
2	1020.	25231.	1319.2	942.3	135.3	64.9	7.1
3	1040.	26972.	3398.1	92.8	78.4	77.9	3.3
4	1081.	9023.	634.5	29.2	161.1	101.6	14.9
5	1083.	1226.	491.3	111.8	208.9	52.7	5.6
6	1089.	2208.	2293.3	54.9	318.3	209.2	12.6
7	1091.	14589.	819.4	2.2	8.3	4.4	0.5
8	1094.	1187.	130.0	1.1	153.0	7.1	1.0
9	1620.	28999.	1481.2	3.4	536.4	449.8	82.2
10	1650.	31456.	1568.6	64.2	261.1	226.8	38.7
11	1720.	2465.	192.0	24.8	104.5	78.8	8.0
12	1740.	15169.	469.5	39.5	212.3	199.0	49.0
13	1750.	1077.	28.3	0.2	19.2	17.4	3.6
14	1790.	5704.	173.7	15.9	80.7	76.2	12.3
15	1810.	8739.	444.9	9.2	180.4	144.4	26.8
16	1820.	4953.	193.4	1.0	83.0	78.6	13.6
17	1830.	5760.	973.5	119.6	535.8	472.6	95.3
18	1840.	482.	19.8	1.6	37.6	10.1	1.8
19	1851.	632.	24.1	6.9	52.2	9.2	1.2
20	1852.	585.	27.4	1.9	1.3	1.3	0.2
21	1860.	7150.	464.9	29.8	56.4	51.4	11.7
22	1891.	868.	42.0	0.0	10.3	9.9	1.7
23	1892.	2295.	66.7	0.5	21.8	20.9	4.7
24	1880,1899	17567.	904.2	26.0	209.0	167.0	37.3
25	2310.	4626.	133.7	1.7	18.2	17.1	3.9
26	2390.	15377.	588.0	11.0	310.8	287.5	78.9
27	2430.	43834.	1290.5	21.2	133.2	124.7	29.6
28	2440.	40429.	1254.0	31.2	139.7	133.1	32.0
29	2450.	6074.	220.8	6.3	29.0	26.9	6.5
30	2460.	2380.	203.2	72.8	51.7	51.6	1.1
31	2480.	3454.	88.5	0.4	4.2	4.2	1.1
32	2450.	3346.	96.1	10.9	45.6	38.6	8.3
33	2510.	68616.	4946.0	3430.3	215.1	1.4	0.2
34	2520.	14067.	845.5	211.6	100.6	97.0	13.0
35	2540.	25468.	1269.8	130.1	63.2	40.8	5.6
36	2560.	3470.	139.7	3.6	5.3	4.4	0.6
37	2580.	846.	28.2	0.0	5.8	5.7	0.9
38	2590.	6537.	351.0	142.6	57.0	36.9	5.4
39	2610.	27829.	950.1	23.0	175.2	166.9	32.1
40	2640.	5880.	248.5	51.0	18.1	18.1	3.2
41	2660.	11243.	462.5	45.7	46.7	44.3	7.7
42	2680.	1661.	51.9	0.0	4.4	3.7	0.6
43	2710.	85601.	7556.7	5562.5	291.0	174.2	23.7
44	2720.	1467.	178.9	40.8	2.7	2.3	0.3
45	2730.	24259.	1511.2	8.4	48.7	46.6	7.7
46	2740.	15456.	872.3	60.6	167.2	149.0	23.9
47	2870.	7044.	228.1	0.4	21.5	17.0	2.6
48	2860,30,[illegible]	90993.	3882.3	123.0	666.2	226.6	33.7
49	2910.	56669.	4935.0	1050.1	719.8	485.6	43.7
50	2920.	6289.	669.5	210.4	282.5	131.1	15.3

51	2940.	10472.	485.4	105.7	145.8	60.4	7.1
52	2950.	32652.	2371.3	1546.4	179.8	31.1	2.3
53	2960.	7060.	799.0	1142.6	264.6	202.4	11.7
54	2970.	3566.	456.6	112.5	45.1	39.9	3.5
55	2980.	5268.	404.1	99.9	91.5	12.2	1.6
56	3010.	9124.	617.6	50.0	68.3	45.8	6.8
57	3020.	16909.	876.4	0.0	10.4	8.2	1.3
58	3030.	16753.	851.4	53.8	29.6	29.1	4.8
59	3040.	34181.	2392.4	37.1	166.8	142.0	23.1
60	3050.	18823.	1180.4	242.3	309.3	171.0	23.4
61	3060.	18856.	740.3	178.6	368.4	318.8	50.9
62	3070.	5086.	244.5	10.3	28.7	26.5	5.0
63	3090.	24904.	1235.1	197.8	575.1	435.9	68.1
64	3150.	63692.	3444.2	1416.5	4392.1	2034.5	278.3
65	3160.	4131.	208.0	43.2	190.0	122.2	17.3
66	3180.	9629.	555.9	493.9	1298.4	747.2	90.5
67	3210.	27721.	1281.0	691.0	839.8	2.4	0.4
68	3240.	15504.	865.5	41.3	71.0	62.5	10.8
69	3260.	8327.	561.6	111.2	145.8	91.6	15.0
70	3270.	13456.	542.4	156.1	26.9	3.5	0.8
71	3280,3290	5925.	271.0	294.6	301.4	173.1	24.8
72	3310.	5181.	262.2	26.5	282.8	221.8	36.3
73	3320.	12806.	697.5	49.1	216.6	189.8	33.8
74	3330.	3928.	190.6	13.0	118.1	65.4	11.5
75	3340.	2332.	170.5	97.0	583.9	340.6	47.9
76	3350.	37895.	1556.6	457.5	907.9	536.3	83.6
77	3360.	27150.	1156.6	131.9	517.0	464.1	72.2
78	3380.	9036.	828.4	52.4	50.9	41.3	6.8
79	3391.	3026.	175.1	17.1	63.3	38.3	6.6
80	3399.	12925.	489.5	103.4	260.7	161.5	26.5
81	3510.	4366.	177.6	4.3	147.5	79.9	13.8
82	3530.	1088.	37.9	3.7	8.8	5.2	0.8
83	3540.	1059.	533.9	3.9	1.8	1.0	0.1
84	3560.	11595.	636.7	65.5	246.5	192.3	23.1
85	3570.	2678.	171.6	110.6	66.0	32.3	5.3
86	3591.	1499.	103.6	26.5	92.4	23.4	3.0
87	3599.	9200.	587.6	58.0	63.5	44.2	6.5
88	3730.	5493.	818.7	309.5	640.9	385.4	45.6
89	3740.	15173.	935.7	60.5	264.3	158.5	16.1
90	3750.	7544.	590.3	6.9	82.8	69.1	10.2
91	3770.	6901.	370.6	7.5	85.4	81.2	11.2
92	3780.	25579.	3020.9	1902.2	1151.5	472.7	58.6
93	3790.	15835.	1136.0	104.1	669.5	372.1	51.1
94	3910.	22776.	928.1	347.6	1357.5	666.7	87.1
95	3920.	6686.	540.2	16.0	181.6	66.3	14.2
96	3930.	9991.	418.4	72.3	371.9	316.3	53.4
97	3970.	6202.	170.1	3.5	12.8	11.8	2.1
98	3991.	2028.	67.6	0.5	16.5	15.4	2.9
99	3993.	3293.	189.1	30.2	151.1	147.4	30.9
100	3992.	13853.	458.9	74.4	477.0	378.4	58.7

TABLE 4: CHANGES IN CAPACITY AND SHIPMENTS AFTER REMOVAL OF PROTECTION,$MILLIONS

	SIC	CHANGE IN IMPORT DEMAND FROM PRICE CHANGES	CHANGE IN DOMESTIC PROD. DEMAND FROM PRICE CHANGES	CHANGE IN DOMESTIC (HIGH-COST) CAPACITY	HIGH-COST SALES PICKED UP BY IMPORTS	HIGH-COST SALES PICKED UP BY DOMESTIC PRODUCERS	NET CHANGE IN DOMESTIC PRODUCTION (1978 PRICES)
1	1012.	2.6	13.7	-0.0	0.0	0.0	13.7
2	1020.	6.6	5.5	-180.2	49.3	131.6	-43.8
3	1040.	2.2	53.6	-355.6	45.3	315.9	8.2
4	1081.	11.9	16.5	0.0	0.0	0.0	16.5
5	1083.	3.3	14.9	-322.5	232.2	100.0	-217.4
6	1089.	8.1	50.4	-179.3	29.0	154.3	21.4
7	1091.	0.4	25.8	-86.6	9.9	79.4	15.9
8	1094.	0.6	6.1	-0.0	0.0	0.0	6.1
9	1620.	187.3	-42.5	-0.0	0.0	0.0	-42.5
10	1650.	73.2	9.9	-0.0	0.0	0.0	9.9
11	1720.	7.0	8.1	-35.5	16.8	20.3	-8.6
12	1740.	124.7	-53.6	-0.0	0.0	0.0	-53.6
13	1750.	4.4	-0.3	0.0	0.0	0.0	-0.3
14	1790.	14.5	2.2	-0.0	0.0	0.0	2.2
15	1810.	22.4	67.5	-444.9	512.4	0.0	-444.9
16	1820.	20.0	4.8	-26.8	11.7	15.8	-6.9
17	1830.	101.6	81.2	-441.1	316.6	162.0	-235.4
18	1840.	1.9	1.8	-13.5	11.9	2.9	-10.0
19	1851.	1.5	1.2	-4.2	2.1	2.3	-1.0
20	1852.	0.2	2.6	-9.1	3.7	6.3	-1.1
21	1860.	15.0	35.8	-157.7	71.5	98.4	-35.7
22	1891.	1.6	5.3	-18.5	11.5	9.4	-6.2
23	1892.	6.1	3.6	-18.9	9.6	10.3	-6.0
24	1880.	46.0	72.8	-151.9	52.6	111.6	20.2
25	2310.	7.3	6.4	-19.2	5.5	14.6	0.9
26	2390.	129.3	-9.0	-2.0	0.8	1.1	-9.8
27	2430.	127.1	-19.0	0.0	0.0	0.0	-19.0
28	2440.	138.0	-34.5	-0.0	0.0	0.0	-34.5
29	2450.	26.7	-5.9	-0.0	0.0	0.0	-5.9
30	2460.	0.8	2.0	-0.0	0.0	0.0	2.0
31	2480.	2.3	8.1	-21.8	7.0	16.8	1.1
32	2490.	24.1	-6.4	-0.0	0.0	0.0	-6.4
33	2510.	0.2	26.4	-22.7	0.1	22.6	26.3
34	2520.	14.3	21.8	-0.0	0.0	0.0	21.8
35	2540.	6.8	34.8	-0.0	0.0	0.0	34.8
36	2560.	0.7	5.7	-0.0	0.0	0.0	5.7
37	2580.	0.9	1.1	-0.0	0.0	0.0	1.1
38	2590.	4.6	14.4	-104.1	44.1	64.3	-29.7
39	2610.	72.5	9.9	-0.0	0.0	0.0	9.9
40	2640.	6.6	10.8	0.0	0.0	0.0	10.8
41	2660.	16.9	16.7	0.0	0.0	0.0	16.7
42	2680.	1.2	3.2	-0.0	0.0	0.0	3.2
43	2710.	30.2	64.8	-1925.6	625.6	1316.5	-560.8
44	2720.	0.2	13.6	-46.8	13.7	36.6	-0.1
45	2730.	8.7	85.3	-0.0	0.0	0.0	85.3
46	2740.	26.2	37.2	-0.0	0.0	0.0	37.2
47	2870.	6.9	3.9	-0.0	0.0	0.0	3.9
48	2860.	77.0	165.2	-368.3	61.4	322.6	103.8
49	2910.	27.0	131.3	-1444.2	554.7	928.0	-423.5
50	2920.	6.9	23.8	-239.4	124.1	123.8	-100.2

51	2940.	6.6	8.1	0.0	0.0	0.0	8.1
52	2950.	1.1	27.7	0.0	0.0	0.0	27.7
53	2960.						
54	2970.	1.6	14.0	-456.6	470.6	0.0	-456.6
55	2980.	1.7	6.8	-46.4	7.2	40.0	-0.4
56	3010.	12.5	25.0	-82.6	18.2	67.8	6.9
57	3020.	2.9	41.4	-105.5	14.5	96.0	27.0
58	3030.	11.7	25.2	0.0	0.0	0.0	25.2
59	3040.	52.0	75.7	0.0	0.0	0.0	75.7
60	3050.	40.7	26.5	-126.7	34.7	94.8	-8.2
61	3060.	108.8	-57.0	0.0	0.0	0.0	-57.0
62	3070.	3.2	27.9	-75.2	31.7	52.1	-3.8
63	3090.	144.8	-60.7	0.0	0.0	0.0	-60.7
64	3150.	389.8	-45.5	0.0	0.0	0.0	-45.5
65	3160.	19.6	10.0	-22.5	12.0	11.6	-1.9
66	3180.	80.7	6.7	-80.1	75.7	5.3	-69.0
67	3210.	0.7	35.7	0.0	0.0	0.0	35.7
68	3240.	19.8	37.4	-128.9	30.0	104.5	7.4
69	3260.	14.0	37.7	-236.3	132.1	120.1	-94.3
70	3270.	4.8	116.4	-257.5	151.2	161.6	-34.8
71	3280, 3290						
72	3310.	35.0	2.7	-49.7	30.6	19.6	-27.9
73	3320.	30.1	41.7	-34.1	10.1	26.0	31.6
74	3330.	11.0	8.2	-33.1	14.3	20.2	-6.1
75	3340.	39.5	-2.8	0.0	0.0	0.0	-2.8
76	3350.	57.7	102.0	-317.3	158.0	180.1	-56.0
77	3360.	70.6	37.1	-223.2	106.7	123.7	-69.7
78	3380.	5.5	65.1	-215.2	69.3	162.7	-4.2
79	3391.	5.2	13.1	-37.5	15.1	25.3	-2.0
80	3399.	23.6	21.7	-49.0	19.5	31.6	2.2
81	3510.	19.0	1.5	-31.2	14.9	16.6	-13.4
82	3530.	1.7	-0.1	-3.3	0.8	2.5	-0.9
83	3540.	0.2	16.5	0.0	0.0	0.0	16.5
84	3560.	15.5	45.9	0.0	0.0	0.0	45.9
85	3570.	3.4	6.4	-35.2	17.6	19.0	-11.1
86	3591.	2.0	6.6	-25.7	11.6	15.8	-5.0
87	3599.	8.6	25.6	0.0	0.0	0.0	25.6
88	3730.	52.0	6.8	-309.9	207.4	105.1	-200.6
89	3740.	25.4	18.9	0.0	0.0	0.0	18.9
90	3750.	17.0	17.5	0.0	0.0	0.0	17.5
91	3770.	15.8	11.5	0.0	0.0	0.0	11.5
92	3780.	75.4	23.7	-693.0	334.7	363.7	-311.1
93	3790.	77.0	5.8	-123.7	47.0	77.3	-41.2
94	3910.	75.8	23.7	-124.2	77.9	49.5	-54.2
95	3920.	22.4	14.2	-73.4	19.4	55.9	-5.2
96	3930.	59.9	-2.6	-46.1	26.4	19.5	-29.0
97	3970.	3.8	3.4	-20.0	3.9	16.5	-0.5
98	3991.	4.1	1.7	-5.9	1.7	4.3	0.0
99	3993.	30.4	3.2	-30.6	18.7	12.4	-15.5
100	3992.	61.3	3.1	-21.2	11.8	9.5	-8.7

TABLE 5: CHANGES IN RENTS TO CONSUMERS AND GOVERNMENT AFTER PROTECTION, $MILLIONS

	1 SIC	2 CONSUMER GAIN DUE TO LOWER IMPORT PRICES	3 CONSUMER GAIN DUE TO LOWER DOMESTIC PRICES	4 CONSUMER LOSS DUE TO LOSS OF HIGH-COST CAPACITY	5 NET CONSUMER GAIN FROM REMOVAL OF PROTECTION	6 GOVERNMENT TARIFF REVENUES LOST
1	1012.	2.6	30.5	0.0	33.2	2.5
2	1020.	9.9	16.7	-15.0	11.6	7.1
3	1040.	4.2	108.5	-29.5	83.2	3.3
4	1081.	15.6	44.5	0.0	60.1	14.9
5	1083.	16.9	22.3	-26.8	12.4	5.6
6	1089.	13.7	105.6	-14.9	104.4	12.6
7	1091.	1.0	52.6	-7.2	46.4	0.5
8	1094.	1.0	13.0	0.0	13.9	1.0
9	1620.	96.7	121.8	0.0	218.4	82.2
10	1650.	44.0	78.1	0.0	122.1	38.7
11	1720.	9.1	12.6	-2.9	18.7	8.0
12	1740.	67.6	33.3	0.0	100.9	49.0
13	1750.	4.2	2.4	0.0	6.6	3.8
14	1790.	13.3	11.7	0.0	25.0	12.3
15	1810.	82.0	44.0	-36.9	89.1	26.8
16	1820.	16.7	17.2	-2.2	31.7	13.6
17	1830.	140.8	121.4	-36.7	225.5	95.3
18	1840.	3.1	2.1	-1.1	4.1	1.8
19	1851.	1.5	2.0	-0.4	3.2	1.2
20	1852.	0.6	3.4	-0.8	3.2	0.2
21	1860.	21.9	53.3	-13.1	62.1	11.7
22	1891.	2.9	6.8	-1.5	8.2	1.7
23	1892.	6.6	7.7	-1.6	12.7	4.7
24	1880,1899	48.8	120.9	-12.6	157.0	37.3
25	2310.	5.7	13.2	-1.6	17.4	3.9
26	2390.	100.1	66.4	-0.2	166.3	78.9
27	2430.	48.8	105.6	0.0	154.4	29.6
28	2440.	53.0	96.1	0.0	149.1	32.0
29	2450.	10.6	19.2	0.0	29.8	6.5
30	2460.	1.1	2.7	0.0	3.7	1.1
31	2480.	2.3	12.9	-1.8	13.4	1.1
32	2450.	11.8	12.1	0.0	23.8	8.3
33	2510.	0.2	35.7	-1.9	34.0	0.2
34	2520.	13.8	37.2	0.0	51.1	13.0
35	2540.	6.0	51.3	0.0	57.3	5.6
36	2560.	0.7	8.1	0.0	8.8	0.6
37	2580.	0.9	1.9	0.0	2.9	0.9
38	2590.	8.5	19.1	-8.6	19.0	5.4
39	2610.	37.9	55.8	0.0	93.8	32.1
40	2640.	3.7	15.1	0.0	18.8	3.2
41	2660.	9.0	27.6	0.0	36.6	7.7
42	2680.	0.7	4.1	0.0	4.8	0.6
43	2710.	63.0	91.0	-159.8	-5.9	23.7
44	2720.	1.3	18.1	-3.9	15.5	0.3
45	2730.	8.3	122.2	0.0	130.5	7.7
46	2740.	25.7	65.4	0.0	91.1	23.9
47	2870.	3.1	8.6	0.0	11.7	2.6
48	2860,2870	42.7	215.8	-30.6	227.9	33.7
49	2910.	67.7	261.3	-119.9	209.2	43.7
50	2920.	22.1	42.6	-19.9	44.8	15.3

51	2940.	7.4	23.3	0.0	30.7	7.1
52	2950.	2.3	56.5	0.0	58.9	2.3
53	2960.					
54	2970.	22.8	9.4	-37.9	-5.7	3.5
55	2980.	2.1	15.6	-3.9	13.8	1.6
56	3010.	8.8	44.3	-6.9	46.3	6.8
57	3020.	2.5	58.9	-8.8	52.6	1.3
58	3030.	5.6	45.9	0.0	51.5	4.8
59	3040.	26.7	152.8	0.0	179.5	23.1
60	3050.	27.9	68.8	-10.5	86.2	23.4
61	3060.	58.4	24.0	0.0	82.4	50.9
62	3070.	7.8	36.9	-6.2	38.4	5.0
63	3090.	77.9	51.7	0.0	129.6	68.1
64	3150.	301.8	98.4	0.0	400.1	278.3
65	3160.	19.3	14.4	-1.9	31.8	17.3
66	3180.	99.0	3.0	-6.6	95.3	90.5
67	3210.	0.4	49.6	0.0	50.0	0.4
68	3240.	14.5	67.4	-10.7	71.1	10.8
69	3260.	25.3	50.2	-19.6	55.8	15.0
70	3270.	53.7	152.1	-21.4	184.4	0.8
71	3280, 90					
72	3310.	40.9	18.0	-4.1	54.8	36.3
73	3320.	36.8	68.6	-2.8	102.6	33.8
74	3330.	13.3	15.5	-2.7	26.1	11.5
75	3340.	50.3	6.8	0.0	57.1	47.9
76	3350.	98.1	137.0	-26.3	208.8	83.6
77	3360.	84.1	78.3	-18.5	143.9	72.2
78	3380.	12.1	88.1	-17.9	82.3	6.8
79	3391.	8.1	18.7	-3.1	23.7	6.6
80	3399.	29.5	37.7	-4.1	63.2	26.5
81	3510.	16.3	15.0	-2.6	28.7	13.8
82	3530.	1.0	1.5	-0.3	2.1	0.8
83	3540.	0.1	22.5	0.0	22.6	0.1
84	3560.	23.9	63.7	0.0	87.6	23.1
85	3570.	6.8	7.8	-2.9	11.7	5.3
86	3591.	3.8	8.5	-2.1	10.1	3.0
87	3599.	7.0	41.0	0.0	48.0	6.5
88	3730.	59.3	30.2	-25.7	63.8	45.6
89	3740.	17.2	45.0	0.0	62.3	16.1
90	3750.	11.3	37.7	0.0	49.0	10.2
91	3770.	12.2	27.1	0.0	39.3	11.2
92	3780.	81.2	68.9	-57.5	92.6	58.6
93	3790.	58.6	64.2	-10.3	112.6	51.1
94	3910.	96.0	53.1	-10.3	138.7	87.1
95	3920.	17.9	37.0	-6.1	48.8	14.2
96	3930.	59.6	29.4	-3.8	85.2	53.4
97	3970.	2.7	7.8	-1.7	8.8	2.1
98	3991.	3.4	5.3	-0.5	8.2	2.9
99	3993.	35.1	18.3	-2.5	50.9	30.9
100	3992.	63.6	34.7	-1.8	96.6	58.7

TABLE 6: CHANGES IN PRODUCER AND TOTAL-ECONOMY RENTS AFTER PROTECTION,$MILLIONS

	SIC	RENTS FROM PROTECTION TO HIGH-COST DOMESTIC PRODUCERS	RENTS FROM PROTECTION TO LOW-COST DOMESTIC PRODUCERS	NET RENTS FROM PROTECTION TO DOMESTIC PRODUCERS	NET ECONOMIC COSTS OF PROTECTION	HIGHER COSTS OF PRODUCTION DUE TO PROTECTION
1	1012.	0.0	30.3	30.3	0.4	0.0
2	1020.	4.2	-10.3	-6.1	10.6	23.8
3	1040.	5.8	52.4	58.2	21.7	50.1
4	1081.	0.0	43.9	43.9	1.4	0.0
5	1083.	13.3	2.5	15.9	-9.0	15.4
6	1089.	5.3	64.9	70.2	21.6	34.9
7	1091.	2.8	25.2	27.9	18.0	24.2
8	1094.	0.0	12.7	12.7	0.3	0.0
9	1620.	0.0	123.6	123.6	12.7	0.0
10	1650.	0.0	77.8	77.8	5.6	0.0
11	1720.	2.2	8.8	11.1	-0.3	1.9
12	1740.	0.0	35.6	35.6	16.3	0.0
13	1750.	0.0	2.4	2.4	0.4	0.0
14	1790.	0.0	11.6	11.6	1.1	0.0
15	1810.	49.4	-1.9	47.5	14.8	42.5
16	1820.	1.2	10.6	11.8	6.3	5.7
17	1830.	36.4	51.9	88.3	42.0	52.5
18	1840.	1.4	0.7	2.1	0.3	0.8
19	1851.	0.3	0.9	1.2	0.8	0.9
20	1852.	0.6	1.4	2.0	1.0	1.5
21	1860.	12.7	26.4	39.2	11.2	16.4
22	1891.	1.9	3.2	5.1	1.4	2.2
23	1892.	1.1	4.2	5.3	2.6	2.7
24	1880.	16.7	84.5	101.2	18.5	18.2
25	2310.	1.5	9.4	11.0	2.6	2.2
26	2390.	0.2	66.6	66.8	20.6	0.1
27	2430.	0.0	106.4	106.4	18.4	0.0
28	2440.	0.0	97.5	97.5	19.6	0.0
29	2450.	0.0	19.5	19.5	3.8	0.0
30	2460.	0.0	2.6	2.6	0.0	0.0
31	2480.	2.5	8.1	10.6	1.7	2.3
32	2450.	0.0	12.5	12.5	3.0	0.0
33	2510.	0.5	30.5	31.0	2.8	4.3
34	2520.	0.0	36.6	36.6	1.5	0.0
35	2540.	0.0	50.5	50.5	1.2	0.0
36	2560.	0.0	7.9	7.9	0.2	0.0
37	2580.	0.0	1.9	1.9	0.1	0.0
38	2590.	5.2	2.8	7.9	5.7	12.7
39	2610.	0.0	55.5	55.5	6.1	0.0
40	2640.	0.0	14.7	14.7	0.9	0.0
41	2660.	0.0	27.1	27.1	1.8	0.0
42	2680.	0.0	3.9	3.9	0.2	0.0
43	2710.	51.1	-98.5	-47.4	17.9	153.3
44	2720.	4.6	8.5	13.1	2.1	5.0
45	2730.	0.0	118.8	118.8	4.0	0.0
46	2740.	0.0	64.0	64.0	3.3	0.0
47	2870.	0.0	8.5	8.5	0.5	0.0
48	2860.	12.1	119.0	131.1	63.1	81.7
49	2910.	83.9	143.1	227.0	-61.5	49.5
50	2920.	16.6	15.2	31.8	-2.3	16.0

51	2940.	0.0	23.0	23.0	0.6	0.0
52	2950.	0.0	55.6	55.6	1.0	0.0
53	2960.					
54	2970.	35.4	-9.2	26.2	-35.4	1.8
55	2980.	1.2	5.3	6.5	5.7	9.1
56	3010.	4.0	25.0	29.0	10.4	15.1
57	3020.	3.5	27.8	31.3	20.0	26.7
58	3030.	0.0	45.2	45.2	1.5	0.0
59	3040.	0.0	150.4	150.4	6.1	0.0
60	3050.	6.6	42.8	49.4	13.4	19.7
61	3060.	0.0	25.3	25.3	6.2	0.0
62	3070.	6.9	17.4	24.3	9.1	12.8
63	3090.	0.0	53.3	53.3	8.2	0.0
64	3150.	0.0	99.5	99.5	22.3	0.0
65	3160.	1.6	11.1	12.7	1.7	1.7
66	3180.	4.3	-3.7	0.7	4.1	6.0
67	3210.	0.0	48.2	48.2	1.5	0.0
68	3240.	8.0	44.9	52.8	7.5	14.2
69	3260.	15.5	16.9	32.4	8.5	23.7
70	3270.	53.1	16.2	69.3	114.3	89.9
71	3280,90					
72	3310.	2.1	11.8	13.8	4.6	5.3
73	3320.	3.3	60.0	63.3	5.5	3.7
74	3330.	1.6	9.0	10.6	4.1	5.2
75	3340.	0.0	6.9	6.9	2.3	0.0
76	3350.	29.3	74.9	104.1	21.0	36.4
77	3360.	8.8	43.0	51.8	19.9	29.3
78	3380.	12.2	37.4	49.7	25.8	38.7
79	3391.	2.8	10.3	13.2	3.9	5.6
80	3399.	3.9	28.0	31.9	4.7	5.6
81	3510.	1.7	9.9	11.6	3.3	4.0
82	3530.	0.1	0.9	1.0	0.3	0.4
83	3540.	0.0	22.1	22.1	0.4	0.0
84	3560.	0.0	61.3	61.3	3.3	0.0
85	3570.	2.5	-1.5	0.9	5.4	7.7
86	3591.	1.5	3.1	4.6	2.5	4.2
87	3599.	0.0	40.0	40.0	1.5	0.0
88	3730.	11.9	8.6	20.5	-2.2	17.2
89	3740.	0.0	44.6	44.6	1.7	0.0
90	3750.	0.0	37.2	37.2	1.7	0.0
91	3770.	0.0	26.7	26.7	1.4	0.0
92	3780.	24.8	-13.2	11.5	22.4	68.4
93	3790.	3.9	37.6	41.5	19.9	24.0
94	3910.	6.0	28.4	34.3	17.3	21.3
95	3920.	2.6	19.4	22.0	12.6	15.2
96	3930.	2.8	22.3	25.1	6.7	5.6
97	3970.	0.5	4.0	4.4	2.3	3.4
98	3991.	0.4	4.2	4.6	0.7	0.7
99	3993.	3.2	14.5	17.7	2.3	1.5
100	3992.	1.7	30.8	32.5	5.4	2.7

TABLE 7: CHANGES IN EMPLOYMENT AFTER PROTECTION AND COSTS PER JOB

	SIC	CHANGE IN EMPLOYMENT IN HIGH-COST CAPACITY	CHANGE IN EMPLOYMENT IN LOW-COST CAPACITY	NET CHANGE IN EMPLOYMENT	PROPORTIONAL CHANGE IN EMPLOYMENT	NET ECONOMIC COST PER JOB OF PROTECTION ($1YEAR)	NET ECONOMIC COST PER DOLLAR WAGE OF PROTECTION
1	1012.	-0.	160.	160.	0.017	-2357.0	-0.200
2	1020.	-3446.	2608.	-838.	-0.033	12668.7	1.124
3	1040.	-2823.	2888.	65.	0.002	-331805.1	-23.465
4	1081.	0.	243.	243.	0.027	-5672.9	-0.466
5	1083.	-805.	262.	-542.	-0.442	-16642.7	-1.103
6	1089.	-173.	193.	21.	0.009	-1046506.2	-111.642
7	1091.	-1542.	1825.	284.	0.019	-63501.5	-4.265
8	1094.	-0.	56.	56.	0.047	-6050.8	-0.384
9	1620.	-0.	-832.	-832.	-0.029	15253.0	1.075
10	1650.	-0.	199.	199.	0.006	-28121.4	-2.353
11	1720.	-456.	345.	-111.	-0.045	-2891.9	-0.226
12	1740.	-0.	-1733.	-1733.	-0.114	9429.9	0.939
13	1750.	0.	-10.	-10.	-0.009	38533.8	3.773
14	1790.	-0.	71.	71.	0.012	-15313.0	-1.606
15	1810.	-8739.	0.	-8739.	-1.000	1694.4	0.149
16	1820.	-686.	510.	-176.	-0.036	35672.9	3.133
17	1830.	-2613.	1221.	-1393.	-0.242	30123.9	1.850
18	1840.	-330.	85.	-245.	-0.507	1130.3	0.096
19	1851.	-111.	86.	-25.	-0.040	32143.2	2.944
20	1852.	-195.	171.	-24.	-0.040	43432.7	3.343
21	1860.	-2425.	1876.	-549.	-0.077	20404.8	1.718
22	1891.	-383.	256.	-127.	-0.147	11220.1	0.994
23	1892.	-649.	443.	-206.	-0.090	12768.3	1.269
24	1880.	-2951.	3344.	393.	0.022	-46990.7	-3.695
25	2310.	-664.	696.	32.	0.007	-81040.5	-8.598
26	2390.	-52.	-205.	-256.	-0.017	80321.0	7.948
27	2430.	0.	-646.	-646.	-0.015	28470.1	2.930
28	2440.	-0.	-1114.	-1114.	-0.028	17583.3	1.850
29	2450.	-0.	-163.	-163.	-0.027	23321.2	2.442
30	2460.	-0.	23.	23.	0.010	-1210.4	-0.095
31	2480.	-849.	894.	45.	0.013	-37291.8	-3.649
32	2490.	-0.	-224.	-224.	-0.067	13336.9	1.403
33	2510.	-314.	679.	364.	0.005	-7653.0	-0.461
34	2520.	-0.	362.	362.	0.026	-4062.5	-0.257
35	2540.	-0.	697.	697.	0.027	-1691.2	-0.132
36	2560.	-0.	141.	141.	0.041	-1477.8	-0.133
37	2580.	-0.	32.	32.	0.038	-3015.6	-0.273
38	2590.	-1940.	1387.	-553.	-0.085	10273.4	0.788
39	2610.	-0.	291.	291.	0.010	-21107.4	-1.941
40	2640.	0.	256.	256.	0.044	-3522.5	-0.276
41	2660.	0.	407.	407.	0.036	-4413.1	-0.360
42	2680.	-0.	103.	103.	0.062	-2055.9	-0.220
43	2710.	-21813.	15460.	-6352.	-0.074	2812.2	0.142
44	2720.	-383.	382.	-1.	-0.001	1677300.6	109.263
45	2730.	-0.	1370.	1370.	0.056	-2912.9	-0.201
46	2740.	-0.	660.	660.	0.043	-4969.6	-0.364
47	2870.	-0.	120.	120.	0.017	-4407.6	-0.281
48	2860.	-8633.	11066.	2433.	0.027	-25915.2	-1.794
49	2910.	-16651.	11769.	-4882.	-0.086	-12598.6	-0.686
50	2920.	-2249.	1307.	-942.	-0.150	-2415.8	-0.139

51	2940.	0.	174.	174.	0.017		
52	2950.	0.	382.	382.	0.012		
53	2960.						
54	2970.	-3586.	0.	-3586.	-1.000	-9883.3	-0.621
55	2980.	-605.	600.	-6.	-0.001	994557.7	77.850
56	3010.	-1220.	1322.	102.	0.011		
57	3020.	-2035.	2555.	521.	0.031		
58	3030.	0.	496.	496.	0.030		
59	3040.	0.	1081.	1081.	0.032		
60	3050.	-2021.	1890.	-131.	-0.007	102228.0	7.095
61	3060.	0.	-1451.	-1451.	-0.077	4281.2	0.299
62	3070.	-1565.	1486.	-79.	-0.016	114704.5	8.240
63	3090.	0.	-1223.	-1223.	-0.049	6724.9	0.494
64	3150.	0.	-842.	-842.	-0.013	26523.1	1.757
65	3160.	-447.	408.	-39.	-0.009	44417.0	3.045
66	3180.	-1387.	191.	-1196.	-0.124	3435.3	0.228
67	3210.	0.	773.	773.	0.028		
68	3240.	-2309.	2442.	133.	0.009		
69	3260.	-3503.	2105.	-1399.	-0.168	6043.0	0.367
70	3270.	-6388.	5525.	-863.	-0.064	132503.6	7.574
71	3280,40						
72	3310.	-982.	430.	-552.	-0.107	8352.7	0.648
73	3320.	-625.	1206.	581.	0.045		
74	3330.	-683.	557.	-126.	-0.032	32588.1	2.753
75	3340.	0.	-39.	-39.	-0.017	59114.7	4.713
76	3350.	-7725.	6361.	-1364.	-0.036	15422.0	1.033
77	3360.	-5240.	3605.	-1635.	-0.060	12193.6	0.827
78	3380.	-2347.	2301.	-46.	-0.005	564772.2	34.930
79	3391.	-648.	614.	-34.	-0.011	114168.4	8.285
80	3399.	-1293.	1351.	58.	0.004		
81	3510.	-768.	438.	-330.	-0.076	9986.6	0.717
82	3530.	-94.	69.	-25.	-0.023	12707.2	1.072
83	3540.	0.	33.	33.	0.031		
84	3560.	0.	837.	837.	0.072		
85	3570.	-550.	376.	-173.	-0.065	31352.1	2.058
86	3591.	-372.	300.	-72.	-0.048	35084.8	2.195
87	3599.	0.	402.	402.	0.044		
88	3730.	-2080.	734.	-1346.	-0.245	-1649.4	-0.089
89	3740.	0.	306.	306.	0.020		
90	3750.	0.	224.	224.	0.030		
91	3770.	0.	215.	215.	0.031		
92	3780.	-5868.	3234.	-2634.	-0.103	8515.6	0.412
93	3790.	-1725.	1150.	-574.	-0.036	34724.6	2.336
94	3910.	-3047.	1718.	-1330.	-0.058	13003.7	0.963
95	3920.	-908.	844.	-64.	-0.010	195663.4	15.934
96	3930.	-1101.	409.	-692.	-0.069	9709.0	0.857
97	3970.	-728.	710.	-18.	-0.003	124073.3	9.667
98	3991.	-177.	176.	-1.	-0.000	969339.7	90.758
99	3993.	-533.	263.	-269.	-0.082	8584.6	0.630
100	3992.	-640.	379.	-262.	-0.019	20798.5	1.927

1970 REVISION OF THE STANDARD INDUSTRIAL CLASSIFICATION (MANUFACTURING INDUSTRIES)

RÉVISION DE 1970 DE LA CLASSIFICATION DES ACTIVITÉS ÉCONOMIQUES (INDUSTRIES MANUFACTURIÈRES)

SIC Code	Industry group and industry
	1 FOOD AND BEVERAGE INDUSTRIES
101	Meat and poultry products industries
1011	Slaughtering and meat processors
1012	Poultry processors
102	Fish products industry
103	Fruit and vegetable processing industries
1031	Fruit and vegetable canners and preservers
1032	Frozen fruit and vegetable processors
104	Dairy products industry
105	Flour and breakfast cereal products industry
106	Feed industry
107	Bakery products industries
1071	Biscuit manufacturers
1072	Bakeries
108	Miscellaneous food industries
1081	Confectionery manufacturers
1082	Cane and beet sugar processors
1083	Vegetable oil mills
1089	Miscellaneous food processors, n.e.s.
109	Beverage industries
1091	Soft drink manufacturers
1092	Distilleries
1093	Breweries
1094	Wineries
	2 – TOBACCO PRODUCTS INDUSTRIES
151	Leaf tobacco processors
153	Tobacco products manufacturers
	3 RUBBER AND PLASTICS PRODUCTS INDUSTRIES
162	Rubber products industries
1623	Tire and tube manufacturers
1624	Rubber footwear manufacturers
1629	Miscellaneous rubber products manufacturers
165	Plastics fabricating industry, n.e.s.
	4 – LEATHER INDUSTRIES
172	Leather tanneries
174	Shoe factories
175	Leather glove factories
179	Luggage, handbag and small leather goods manufacturers
1792	Boot and shoe findings manufacturers
1799	Miscellaneous leather products manufacturers
	5 TEXTILE INDUSTRIES
181	Cotton yarn and cloth mills
182	Wool yarn and cloth mills
183	Man-made fibre, yarn and cloth mills
1831	Fibre and filament yarn manufacturers
1832	Throwsters, spun yarn and cloth mills
184	Cordage and twine industry
185	Felt and fibre processing mills
1851	Fibre processing mills
1852	Pressed and punched felt mills
186	Carpet, mat and rug industry
187	Canvas products and cotton and jute bags industries
1871	Cotton and jute bags manufacturers
1872	Canvas products manufacturers
188	Automobile fabric accessories industry
189	Miscellaneous textile industries
1891	Thread mills
1892	Narrow fabric mills
1893	Embroidery, pleating and hemstitching manufacturers
1894	Textile dyeing and finishing plants
1899	Miscellaneous textile industries, n.e.s.

Code de la CAI	Groupe d'industries et industrie
	1 INDUSTRIE DES ALIMENTS ET BOISSONS
101	Industrie de la viande et de la volaille
1011	Abattage et conditionnement de la viande
1012	Conditionnement de la volaille
102	Industrie de la transformation du poisson
103	Preparation de fruits et de légumes
1031	Conserveries de fruits et de légumes
1032	Preparation de fruits et de légumes congelés
104	Industrie laitière
105	Meunerie et fabrication de céréales de table
106	Fabrication d'aliments pour les animaux
107	Boulangerie et pâtisserie (fabrication)
1071	Fabricants de biscuits
1072	Boulangeries
108	Industries alimentaires diverses
1081	Fabricants de confiserie
1082	Traitement du sucre de canne et de betteraves
1083	Moulins à huile végétale
1089	Traitement de produits alimentaires divers, n.c.a.
109	Industrie des boissons
1091	Fabricants de boissons gazeuses
1092	Distilleries
1093	Brasseries
1094	Producteurs de vin
	2 – INDUSTRIE DU TABAC
151	Traitement du tabac en feuilles
153	Fabricants de produits du tabac
	3 INDUSTRIE DU CAOUTCHOUC ET DES PRODUITS EN MATIÈRE PLASTIQUE
162	Industrie des produits en caoutchouc
1623	Fabricants de pneus et de chambres à air
1624	Fabricants de chaussures en caoutchouc
1629	Fabricants de produits divers en caoutchouc
165	Fabrication d'articles en matière plastique, n.c.a.
	4 – INDUSTRIE DU CUIR
172	Tanneries
174	Fabriques de chaussures
175	Fabriques de gants en cuir
179	Fabricants de valises, sacs à main et menus articles en cuir
1792	Fabricants d'accessoires pour bottes et chaussures
1799	Fabricants d'articles divers en cuir
	5 INDUSTRIE TEXTILE
181	Filature et tissage du coton
182	Filature et tissage de la laine
183	Fabrication de fibres, filés et tissus artificiels et synthétiques
1831	Fabricants de filés de fibres et de filaments
1832	Moulinages, filatures et tissages
184	Corderie et ficellerie (fabrication)
185	Industrie du feutre et du traitement des fibres
1851	Usines de traitement de fibres
1852	Fabriques de feutre pressé et aéré
186	Industrie des tapis, des carpettes et de la moquette
187	Industrie des articles en grosse toile et des sacs de coton et de jute
1871	Fabricants de sacs de coton et de jute
1872	Fabricants d'articles en grosse toile
188	Industrie des accessoires en tissu pour l'automobile
189	Industries textiles diverses
1891	Fabriques de fil
1892	Rubanerie (fabrication)
1893	Fabricants de broderie, plissage et ourlets à jour
1894	Usines de teinture et de finissage de textiles
1899	Industries textiles diverses, n.c.a.

1970 REVISION OF THE STANDARD INDUSTRIAL CLASSIFICATION (MANUFACTURING INDUSTRIES) Continued

RÉVISION DE 1970 DE LA CLASSIFICATION DES ACTIVITÉS ÉCONOMIQUES (INDUSTRIES MANUFACTURIÈRES) suite

SIC Code	Industry group and industry	Code de la CAI	Groupe d'industries et industrie
	6 – KNITTING MILLS		**6 – BONNETERIE**
231	Hosiery mills	231	Industrie des bas et chaussettes
239	Knitting mills (except hosiery mills)	239	Bonneterie (sauf fabrication de bas et chaussettes)
2391	Knitted fabric manufacturers	2391	Fabricants de tissu à mailles
2392	Other knitting mills	2392	Autres fabricants de tricot
	7 CLOTHING INDUSTRIES		**7 INDUSTRIE DE L'HABILLEMENT**
243	Men's clothing industries	243	Industrie des vêtements pour hommes
2431	Men's clothing factories	2431	Usines de confection de vêtements pour hommes
2433	Men's clothing contractors	2433	Confectionneurs à forfait de vêtements pour hommes
244	Women's clothing industries	244	Industrie des vêtements pour dames
2441	Women's clothing factories	2441	Usines de confection de vêtements pour dames
2442	Women's clothing contractors	2442	Confectionneurs à forfait de vêtements pour dames
245	Children's clothing industry	245	Industrie des vêtements pour enfants
246	Fur goods industry	246	Industrie des articles en fourrure
248	Foundation garment industry	248	Industrie des corsets et soutiens-gorge
249	Miscellaneous clothing industries	249	Industries diverses de l'habillement
2491	Fabric glove manufacturers	2491	Fabricants de gants en tissu
2492	Hat and cap industry	2492	Industrie des chapeaux et casquettes
2499	Miscellaneous clothing industries, n.e.s.	2499	Industries diverses du vêtement, n.c.a.
	8 WOOD INDUSTRIES		**8 INDUSTRIE DU BOIS**
251	Sawmills, planing mills and shingle mills	251	Scieries, ateliers de tabotage et usines de bardeaux
2511	Shingle mills	2511	Usines de bardeaux
2513	Sawmills and planing mills	2513	Scieries et ateliers de rabotage
252	Veneer and plywood mills	252	Fabriques de placages et de contre-plaqués
254	Sash, door and other millwork plants	254	Industrie des portes, châssis et autres bois ouvrés
2541[1,2]	Sash, door and other millwork plants n.e.s.	2541[1,2]	Fabrication de portes, châssis et autres bois ouvrés, n.c.a.
25422	Hardwood flooring plants	25422	Fabrication de parquets en bois dur
2543	Manufacturers of pre-fabricated buildings (woodframe construction)	2543	Préfabrication de bâtiments (charpentes en bois)
25441	Manufacturers of wooden kitchen cabinets	25441	Fabricants d'armoires de cuisine en bois
256	Wooden box factories	256	Fabriques de boîtes en bois
258	Coffin and casket industry	258	Industrie des cercueils
259	Miscellaneous wood industries	259	Industries diverses du bois
2591	Wood preservation industry	2591	Traitement protecteur du bois
2592	Wood handles and turning industry	2592	Fabrication de manches en bois et tournage sur bois
2593	Manufacturers of particle board	2593	Fabricants de panneaux agglomérés
2599	Miscellaneous wood industries, n.e.s.	2599	Industries diverses du bois, n.c.a.
	9 – FURNITURE AND FIXTURE INDUSTRIES		**9 – INDUSTRIE DU MEUBLE ET DES ARTICLES D'AMEUBLEMENT**
261	Household furniture manufacturers	261	Industrie des meubles de maison
2611	Furniture re-upholstery and repair shops	2611	Réfection de rembourrage et réparation de meubles
2619	Household furniture manufacturers, n.e.s.	2619	Industrie des meubles de maison, n.c.a.
264	Office furniture manufacturers	264	Industrie des meubles de bureau
266	Miscellaneous furniture and fixtures manufacturers	266	Industrie des articles d'ameublement divers
268	Electric lamp and shade manufacturers	268	Industrie des lampes électriques et des abat-jour
	10 – PAPER AND ALLIED INDUSTRIES		**10 – INDUSTRIE DU PAPIER ET ACTIVITÉS ANNEXES**
271	Pulp and paper mills	271	Usines de pâtes et papiers
272	Asphalt roofing manufacturers	272	Fabricants de papier de couverture asphalté
273	Paper box and bag manufacturers	273	Fabricants de boîtes en carton et de sacs en papier
2731	Folding carton and set-up box manufacturers	2731	Fabricants de cartons pliants et de boîtes montées
2732	Corrugated box manufacturers	2732	Fabricants de boîtes en carton ondulé
2733	Paper and plastic bag manufacturers	2733	Fabricants de sacs en papier et en plastique
274	Miscellaneous paper converters	274	Transformations diverses du papier
	11 – PRINTING, PUBLISHING AND ALLIED INDUSTRIES		**11 – IMPRIMERIE, ÉDITION ET ACTIVITÉS ANNEXES**
286	Commercial printing	286	Imprimerie commerciale
287	Platemaking, typesetting and trade bindery industry	287	Industrie du clichage, de la composition et de la reliure commerciale
288	Publishing only	288	Édition seulement
289	Publishing and printing	289	Édition et impression

See footnote(s) at end of table. Voir note(s) à la fin du tableau

1970 REVISION OF THE STANDARD INDUSTRIAL CLASSIFICATION (MANUFACTURING INDUSTRIES) Continued

RÉVISION DE 1970 DE LA CLASSIFICATION DES ACTIVITÉS ÉCONOMIQUES (INDUSTRIES MANUFACTURIÈRES) - suite

SIC Code	Industry group and industry	Code de la CAI	Groupe d'industries et industrie
	12 - PRIMARY METAL INDUSTRIES		**12 – PREMIÈRE TRANSFORMATION DES MÉTAUX**
291	Iron and steel mills	291	Sidérurgie
292	Steel pipe and tube mills	292	Fabriques de tubes et tuyaux d'acier
294	Iron foundries	294	Fonderies de fer
295	Smelting and refining	295	Fonte et affinage
296	Aluminum rolling, casting and extruding	296	Laminage, moulage et extrusion de l'aluminium
297	Copper and copper alloy rolling, casting and extruding	297	Laminage, moulage et extrusion du cuivre et de ses alliages
298	Metal rolling, casting and extruding, n.e.s.	298	Laminage, moulage et extrusion des métaux, n.c.a.
	13 METAL FABRICATING INDUSTRIES (EXCEPT MACHINERY AND TRANSPORTATION EQUIPMENT INDUSTRIES)		**13 FABRICATION DE PRODUITS EN MÉTAL (SAUF MACHINES ET ÉQUIPEMENT DE TRANSPORT)**
301	Boiler and plate works	301	Industrie des chaudières et des plaques
302	Fabricated structural metal industry	302	Fabrication d'éléments de charpente métallique
303	Ornamental and architectural metal industry	303	Industrie des produits métalliques d'architecture et d'ornement
3031	Metal door and window manufacturers	3031	Fabricants de portes et fenêtres métalliques
3039	Ornamental and architectural metal industry, n.e.s.	3039	Fabrication de produits métalliques d'architecture et d'ornement, n.c.a.
304	Metal stamping, pressing and coating industry	304	Industrie de l'emboutissage, du matriçage et du revêtement des métaux
3041	Metal coating industry	3041	Industrie du revêtement des métaux
3042	Metal stamping and pressing industry	3042	Industrie de l'emboutissage et du matriçage des métaux
305	Wire and wire products manufacturers	305	Industrie du fil métallique et de ses produits
3051	Fasteners manufacturers	3051	Fabricants d'agrafes
3059	Wire and wire products manufacturers, n.e.s.	3059	Industrie du fil métallique et de ses produits, n.c.a.
306	Hardware, tool and cutlery manufacturers	306	Fabricants de quincaillerie, d'outillage et de coutellerie
307	Heating equipment manufacturers	307	Fabricants d'appareils de chauffage
308	Machine shops	308	Ateliers d'usinage
309	Miscellaneous metal fabricating industries	309	Fabrication de produits métalliques divers
	14 MACHINERY INDUSTRIES (EXCEPT ELECTRICAL MACHINERY)		**14 FABRICATION DE MACHINES (SAUF ÉLECTRIQUES)**
311	Agricultural implement industry	311	Fabricants d'instruments aratoires
315	Miscellaneous machinery and equipment manufacturers	315	Fabricants de machines et d'équipement divers
316	Commercial refrigeration and air conditioning equipment manufacturers	316	Fabricants d'équipement commercial de réfrigération et de climatisation
318	Office and store machinery manufacturers	318	Fabricants de machines pour le bureau et le commerce
	15 TRANSPORTATION EQUIPMENT INDUSTRIES		**15 – FABRICATION D'ÉQUIPEMENT DE TRANSPORT**
321	Aircraft and aircraft parts manufacturers	321	Fabricants d'aéronefs et de pièces
323	Motor vehicle manufacturers	323	Fabricants de véhicules automobiles
324	Truck body and trailer manufacturers	324	Fabricants de carrosseries de camions et remorques
3241	Truck body manufacturers	3241	Fabricants de carrosseries de camions
3242	Non commercial trailer manufacturers	3242	Fabricants de remorques à usage non commercial
3243	Commercial trailer manufacturers	3243	Fabricants de remorques à usage commercial
325	Motor vehicle parts and accessories manufacturers	325	Fabricants de pièces et accessoires d'automobiles
326	Railroad rolling stock industry	326	Fabricants de matériel ferroviaire roulant
327	Shipbuilding and repair	327	Construction et réparation de navires
328	Boatbuilding and repair	328	Construction et réparation d'embarcations
329	Miscellaneous vehicle manufacturers	329	Fabricants de véhicules divers
	16 - ELECTRICAL PRODUCTS INDUSTRIES		**16 FABRICATION DE PRODUITS ÉLECTRIQUES**
331	Manufacturers of small electrical appliances	331	Fabricants de petits appareils électriques
332	Manufacturers of major appliances (electric and non electric)	332	Fabricants de gros appareils (électriques ou non)
333	Manufacturers of lighting fixtures	333	Fabricants d'appareils d'éclairage
334	Manufacturers of household radio and television receivers	334	Fabricants de radiorécepteurs et de téléviseurs ménagers
335	Communications equipment manufacturers	335	Fabricants d'équipement de télécommunication
336	Manufacturers of electrical industrial equipment	336	Fabricants d'équipement électrique industriel
338	Manufacturers of electric wire and cable	338	Fabricants de fils et de câbles électriques
339	Manufacturers of miscellaneous electrical products	339	Fabricants de produits électriques divers
3391	Battery manufacturers	3391	Fabricants d'accumulateurs
3399	Manufacturers of miscellaneous electrical products, n.e.s.	3399	Fabricants de produits électriques divers, n.c.a.

See footnote(s) at end of table. Voir note(s) à la fin du tableau

1970 REVISION OF THE STANDARD INDUSTRIAL CLASSIFICATION (MANUFACTURING INDUSTRIES) Continued

RÉVISION DE 1970 DE LA CLASSIFICATION DES ACTIVITÉS ÉCONOMIQUES (INDUSTRIES MANUFACTURIÈRES) suite

SIC Code	Industry group and industry	Code de la CAI	Groupe d'industries et industrie
	17 - NON-METALLIC MINERAL PRODUCTS INDUSTRIES		**17 - FABRICATION DE PRODUITS MINÉRAUX NON MÉTALLIQUES**
351	Clay products manufacturers	351	Fabricants de produits en argile
3511	Clay products manufacturers (from domestic clays)	3511	Fabricants de produits en argile (de provenance canadienne)
3512	Clay products manufacturers (from imported clays)	3512	Fabricants de produits en argile (importée)
352	Cement manufacturers	352	Fabricants de ciment
353	Stone products manufacturers	353	Fabricants de produits en pierre
354	Concrete products manufacturers	354	Fabricants de produits en béton
3541	Concrete pipe manufacturers	3541	Fabricants de tuyaux en béton
3542	Manufacturers of structural concrete products	3542	Fabricants d'éléments de structure en béton
3549	Concrete products manufacturers, n.e.s.	3549	Fabricants de produits en béton, n.c.a.
355	Ready mix concrete manufacturers	355	Fabricants de béton préparé
356	Glass and glass products manufacturers	356	Fabricants de verre et d'articles en verre
3561	Glass manufacturers	3561	Fabricants de verre
3562	Glass products manufacturers	3562	Fabricants d'articles en verre
357	Abrasives manufacturers	357	Fabricants d'abrasifs
358	Lime manufacturers	358	Fabricants de chaux
359	Miscellaneous non-metallic mineral products industries	359	Industrie des produits minéraux non métalliques divers
3591	Refractories manufacturers	3591	Fabricants de produits réfractaires
3599	Miscellaneous non-metallic mineral products industries, n.e.s.	3599	Industries des produits minéraux non métalliques divers, n.c.a.
	18 - PETROLEUM AND COAL PRODUCTS INDUSTRIES		**18 - FABRICATION DE PRODUITS DU PÉTROLE ET DU CHARBON**
365	Petroleum refineries	365	Raffineries de pétrole
3651	Petroleum refining	3651	Raffinage du pétrole
3652	Manufacturers of lubricating oils and greases	3652	Fabrication d'huiles et de graisses lubrifiantes
369	Miscellaneous petroleum and coal products industries	369	Fabricants de dérivés divers du pétrole et du charbon
	19 - CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES		**19 - INDUSTRIE CHIMIQUE**
372	Manufacturers of mixed fertilizers	372	Fabricants d'engrais composés
373	Manufacturers of plastics and synthetic resins	373	Fabricants de matières plastiques et de résines synthétiques
374	Manufacturers of pharmaceuticals and medicines	374	Fabricants de produits pharmaceutiques et de médicaments
375	Paint and varnish manufacturers	375	Fabricants de peintures et vernis
376	Manufacturers of soap and cleaning compounds	376	Fabricants de savon et de produits de nettoyage
377	Manufacturers of toilet preparations	377	Fabricants de produits de toilette
378	Manufacturers of industrial chemicals	378	Fabricants de produits chimiques industriels
3781	Manufacturers of pigments and dry colours	3781	Fabricants de pigments et de colorants secs
3782	Manufacturers of industrial chemicals (inorganic), n.e.s.	3782	Fabricants de produits chimiques (inorganiques) industriels, n.c.a.
3783	Manufacturers of industrial chemicals (organic), n.e.s.	3783	Fabricants de produits chimiques (organiques) industriels, n.c.a.
379	Miscellaneous chemical industries	379	Fabricants de produits chimiques divers
3791	Manufacturers of printing inks	3791	Fabricants d'encres d'imprimerie
3799	Miscellaneous chemical industries, n.e.s.	3799	Fabricants de produits chimiques divers, n.c.a.
	20 - MISCELLANEOUS MANUFACTURING INDUSTRIES		**20 - INDUSTRIES MANUFACTURIÈRES DIVERSES**
391	Scientific and professional equipment industries	391	Fabrication de matériel scientifique et professionnel
3911	Instrument and related products manufacturers	3911	Fabricants d'instruments et de produits similaires
3912	Clock and watch manufacturers	3912	Fabricants d'horloges et de montres
3913	Orthopaedic and surgical appliance manufacturers	3913	Fabricants d'appareils orthopédiques et chirurgicaux
3914	Ophthalmic goods manufacturers	3914	Fabricants d'articles ophtalmiques
3915	Dental laboratories	3915	Ateliers de mécanicien-dentiste
392	Jewellery and silverware industry	392	Fabrication de bijouterie et d'orfèvrerie
393	Sporting goods and toy industries	393	Fabrication d'articles de sport et de jouets
3931	Sporting goods manufacturers	3931	Fabricants d'articles de sport
3932	Toys and games manufacturers	3932	Fabricants de jeux et de jouets
397	Signs and displays industry	397	Fabrication d'enseignes et d'étalages
399	Miscellaneous manufacturing industries, n.e.s.	399	Industries manufacturières diverses, n.c.a.
3991	Broom, brush and mop manufacturers	3991	Fabricants de balais, de brosses et de balais à franges
3992	Button, buckle and fastener manufacturers	3992	Fabricants de boutons, de boucles et d'agrafes
3993	Floor tile, linoleum and coated fabrics manufacturers	3993	Fabricants de carreaux, de dalles, de linoléum et de tissus enduits

1970 REVISION OF THE STANDARD INDUSTRIAL CLASSIFICATION (MANUFACTURING INDUSTRIES) Concluded

RÉVISION DE 1970 DE LA CLASSIFICATION DES ACTIVITÉS ÉCONOMIQUES (INDUSTRIES MANUFACTURIÈRES) fin

SIC Code	Industry group and industry	Code de la CAE	Groupe d'industries et industrie
	20 MISCELLANEOUS MANUFACTURING INDUSTRIES Concluded		**20 -- INDUSTRIES MANUFACTURIÈRES DIVERSES fin**
3991	Sound recording and musical instrument manufacturers	3994	Enregistrement du son et fabrication d'instruments de musique
3995[4]	Stamp and stencil (rubber and metal) manufacturers	3995[4]	Fabricants de tampons et de pochoirs (en caoutchouc ou en métal)
3996	Pen and pencil manufacturers	3996	Fabricants de stylos et de crayons
3997[4]	Typewriter supplies manufacturers	3997[4]	Fabricants de fournitures pour la dactylographie
3998	Fur dressing and dyeing	3998	Apprêtage et teinture de fourrure
3999[4]	Other miscellaneous manufacturing industries	3999[4]	Autres industries manufacturières diverses

[1] Effective 1972 Census of Manufactures, SIC 2544 was created as a separate industry; its establishments were formerly in SIC 2541. La classe CAE 2544, créée au recensement des manufactures de 1972, figure comme une industrie distincte; ces établissements appartenaient auparavant à la classe CAE 2541.

[2] Effective 1976 Census of Manufactures, SIC 2542 was eliminated as a separate class and included in SIC 2541. Depuis le recensement des manufactures de 1976, la classe CAE 2542 ne figure plus à part mais est incluse dans la classe CAE 2541.

[3] Effective 1976 Census of Manufactures, created by the division of SIC 305. - Cette classe existe depuis le recensement des manufactures de 1976, elle a été créée par la division de la classe CAE 305.

[4] Effective 1976 Census of Manufactures, SIC 3995 and 3997 were eliminated as separate classes and included in SIC 3999. Depuis le recensement des manufactures de 1976, les classes CAE 3995 et 3997 ne figurent plus à part mais ont été incluses dans la classe CAE 3999.

Notes on data sources

1. All import, export and duties paid data are from computer printouts supplied by G.L. Blaney of the External Trade Division of Statistics Canada. These printouts are generated by a program which converts Statistics Canada trade data from its MCC and XCC commodity classifications into the Standard Industrial Classification (SIC), used in this study.

2. The Non-tariff barrier numbers are discussed on page 35 of the paper.

3. The Herfindahl index of seller concentration comes from Statistics Canada's publications 31-402, 1974, with gaps in the data filled in by T. Hazledine. The index is defined as the sum of the squared market shares of all the enterprises (firms) in an industry.

4. For the market price elasticity of demand, the 2-digit SIC estimates prepared by the Economic Council of Canada for their CANDIDE 2.0 model are rounded to the nearest 0.25.

The import relative price elasticity is calculated, according to the formula given on page 41 of the paper, from the market elasticities and from the 'best' estimates for the U.S. decided on by Stern et al. (1976, p. 25) from their comprehensive survey of previous econometric work estimating import demand elasticities.

5. Data on the (total) number of employees, on wages and salaries paid them, and on the value of production, are from Table 3 of Statistics Canada's publication Manufacturing Industries of Canada: National and Provincial Areas (31-203) 1978, Table 3.

6. The average cost data come from special tabulations made for the author by Ken Young of the Special Projects Section of the Manufacturing and Primary Industries Division of Statistics Canada. These data are described in the text (pp. 43ff).

7. Capital/Output ratios are calculated by dividing the mid-year net capital stock figure for each industry, from unpublished Statistics Canada data, by the value of production.

Appendix B: Stability of the Cost Distributions

It is important that the 1978 intra-industry cost data give a picture of industry costs that is not distorted by cyclical or 'random' variations. Two issues are involved: (a) the stability over time of each industry's cost line, and, (b), the stability over time of each establishment's position on the line. We deal in turn with these in this Appendix.

(a) Stability of the cost lines

It is conceivable, to take an extreme case, that all industries have the same 'long-run' distribution of average costs, so that the inter-industry differences in slopes and intercepts of the cost line revealed by our 1978 data just reflect year-to-year events, such as differences in incidence of the business cycle, or random exogenous events (such as irregular completions of unusually large new plants). If so, then our use of the 1978 distribution to estimate the proportion of each industry's capacity that would be forced out by a tariff cut would be invalid, since it is unlikely that year-to-year fluctuations would influence a 'long-term' decision like closing-down an establishment.

To check on the stability of the cost distributions, I had Statistics Canada calculate them for 1970 and 1974 as well as 1978. I then regressed (a) the intercept (b) the slope of one year's cost line on the same parameter for another year. The results were:

$$a_{78,i} = \underset{(2.3)}{0.085} + \underset{(12.3)}{0.794}\, a_{74,i} \qquad \bar{R}^2 = 0.51$$

$$a_{78,i} = \underset{(1.18)}{0.063} + \underset{(13.9)}{0.818}\, a_{70,i} \qquad \bar{R}^2 = 0.57$$

$$a_{74,i} = \underset{(4.0)}{0.14} + \underset{(16.1)}{0.778}\, a_{70,i} \qquad \bar{R}^2 = 0.64$$

$$b_{78,i} = \underset{(5.1)}{0.167} + \underset{(5.4)}{0.556}\, b_{74,i} \qquad \bar{R}^2 = 0.167$$

$$b_{78,i} = \underset{(6.1)}{0.187} + \underset{(5.1)}{0.522}\, b_{70,i} \qquad \bar{R}^2 = 0.152$$

$$b_{74,i} = \underset{(7.3)}{0.153} + \underset{(7.4)}{0.512}\, b_{70,i} \qquad \bar{R}^2 = 0.270$$

In these regressions, 'a' is the intercept, and 'b' the slope of the cost distributions (line B of figure 5, p. 45) for the year shown, measured for each industry i.

We find that there is a highly significant relationship between the intercepts of the industries' cost distributions across each of the three pairs of observed years, and that there is a less strong, but still significant relation between the slopes of the lines (t-ratios are given in parentheses).

Thus, the cost distributions do not only vary randomly -- the structure of each industry's costs in one year is significantly correlated with the structure four or eight years previously.

However, the correlations are not perfect. Some of the 'error' could be due to long-term shifts in industry cost structures due, say, to technological change. Ignoring these would not cause any problems in our ceteris paribus analysis of the partial equilibrium impact of tariff cuts. However, the fact that the 1978-70 relationships are about as good as those for the shorter 1978-74 period is not consistent with structural change being a major factor, since this would tend to worsen the correlation as the distance between comparison dates increased.

Thus, we must expect that some inter-industry variations in the slopes of intra-industry cost distributions is due to cyclical and other short-term factors.

It might therefore, be worthwhile to have 1976 and 1977 distributions calculated by Statistics Canada, and use the average over these years and 1978 for each industry's cost line.

(b) Stability of Establishments' position in the cost distribution

Even if each industry's cost distribution were stable, the position within it of individual establishments could alter year-to-year, as individual establishments within an industry experience 'good' and 'bad' years that are not completely due to factors affecting equally all establishments in the industry.

Such transitory ups and downs should approximately cancel-out in the middle range of the cost distribution, with establishments having unusually good years swapping places with those doing unusually badly, and thus with no particular tendency to bias the slope of the regression line fitted to the scatter of observations on average costs. However, the extreme low end of the cost distribution will tend to be dominated by establishments having unusually profitable years, and the highest-cost end by establishments doing unusually poorly.

The effects of this are clearly visible on the 'average' 1974 cost/shipment distribution line, which was calculated by averaging across all the industries the cost/shipment value read-off from each industry's fitted regression line at each decile of the distribution,[1] and linearly interpolating between the average values.

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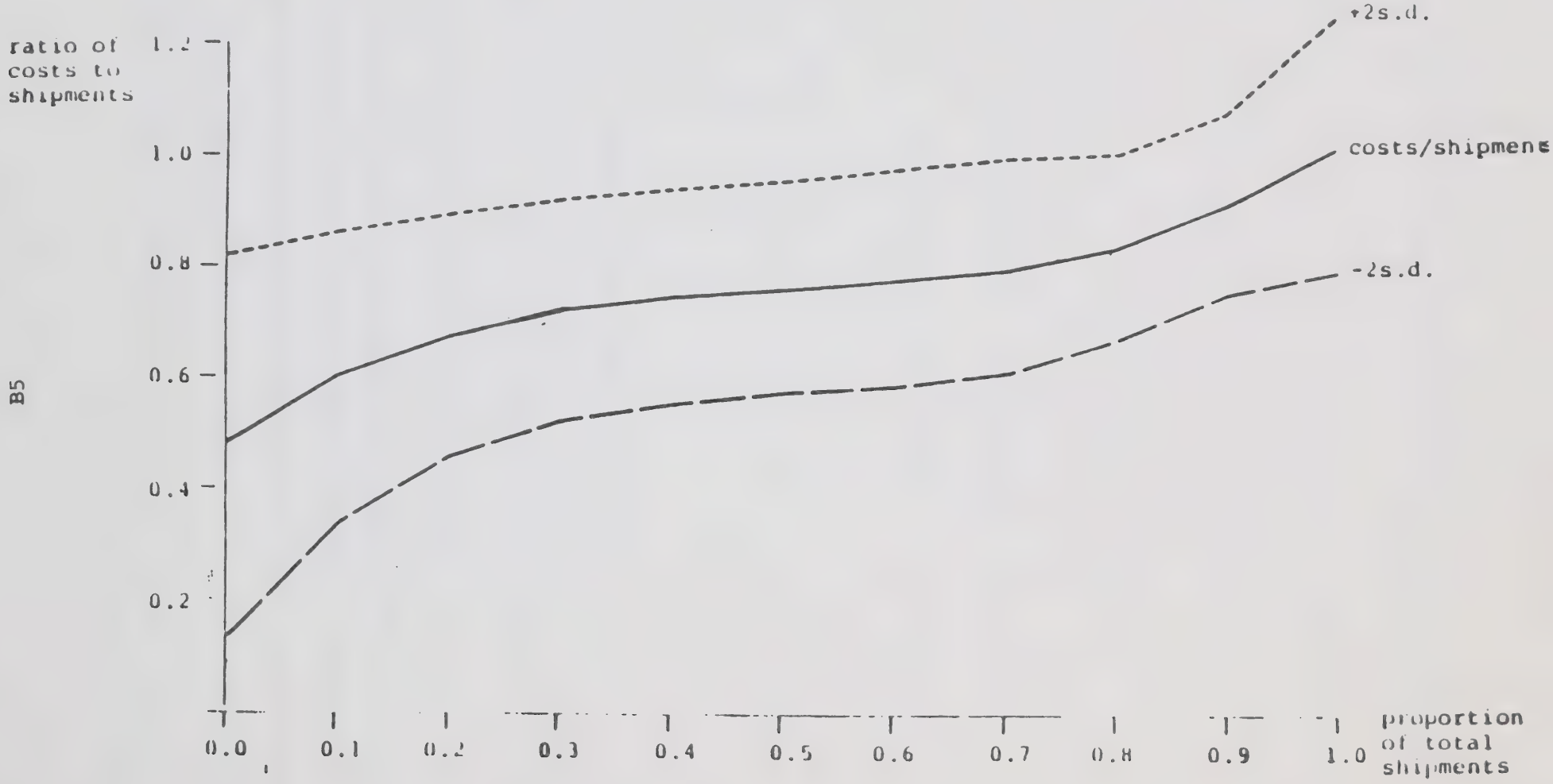
1 The 2-standard deviation bounds of the cost/shipment ratios are drawn-in on the figure.

Average Cost/Shipment Distribution, 1974



B5

This line shows a definite downward twist of its low end, and an upward twist at the high end.

It was for this reason that the average cost distribution lines used in this study were constructed as linear interpolations between the 0.2 and 0.8 decile points on the cubic regression lines of each industry (cf. line B on figure 5, p. 45).

It is hoped that this (straight) line will satisfactorily approximate the distribution of 'long-run' establishment costs which is expected to be revealed by the slope of the regression line over its middle range.

Appendix C: The Pricing Model

The price equation (3) of section V is the result of an econometric analysis of differences between Canadian and U.S. industry selling prices in 33 industries in 1972. The relative price data came from work done by James Frank of the Conference Board in Canada, and are described in Hazledine (1980d).

In that paper, the best-fitting model was found to be[1]

$$P_c/P_{us,i} = \underset{(89.3)}{0.981(1-X_i)C_i} + \underset{(6.1)}{3.775(1-X_i)(1+t_i - C_i)H_i} + \underset{(22.0)}{0.924X_i}$$

$$\bar{R}^2 = 0.730 \quad (C1)$$

- the relative Canadian/U.S. price of industry i is determined by (a) relative costs (C_i) multiplied by one minus the share (X_i) of exports in domestic output; (b) one plus the Canadian tariff rate (t_i) minus relative costs, all multiplied by ($1 - X_i$) and the Herfindahl index (H_i); (c) the share of exports.

The export shares enter the specification to 'correct' the price data, which are a weighted average of domestic prices and export prices (that should not be affected by domestic tariffs), and have no behavioural significance.

What equation (C1) states is that domestic selling prices relative to those in the U.S. (taken to be 'the world') are set as a weighted average of cost factors and market forces, represented

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1 In this Appendix we will use the notation of the (1980d) paper; not the notation used above in the present study.

here by the domestic market price of competing imports, with the weights determined by the Herfindahl index of seller concentration. The economic rationale of this model is discussed at the start of section III above.

A problem with specification (C1) is that it makes no allowance for the intrinsic substitutability of domestic goods and imports. We would not expect a tariff, no matter how high, on bread or ready-mixed concrete to have any effect on the prices of domestically produced output, simply because transport costs eliminate these commodities from international trade.

On the other hand, a tariff on, say, soybean oil should be closely related to domestic prices, no matter how unconcentrated the domestic industry, because this is an easily transported, homogenous product traded on well-organised markets.

A good measure of substitutability might be some index of how much of world output of the commodity is traded internationally. Unfortunately, there was not time to construct such an index for each of the 100 industries in this study, so I made do with a measure of Canadian trade activity -- the ratio of the sum of Canadian imports and exports of the industry to Canadian domestic sales (TRADERAT):

$$TRADERAT_i \equiv \frac{EXPORTS_i + IMPORTS_i}{DOMESTIC\ SALES_i} \qquad (C.2)$$

A likely weakness of this variable is that Canadian imports will themselves be affected by the tariff rates actually imposed, so that our 'independent' variables may be related.

A number of specifications including TRADERAT (restricted to a maximum value of 1.0) as a multiplicative argument in the price setting formula were tried out in regression runs. The best specification seemed to be:

$$P_c/P_{us,i} = \underset{(89.6)}{0.979(1-X_i)C_i} + \underset{(6.2)}{1.365(1-X_i)(1+t_i-C_i)(3.33H_i)(TRADERAT_i)^{0.09}} + \underset{(22.5)}{0.925X_i} \qquad (C.3)$$

$$\bar{R}^2 = 0.734$$

Though (C3) doesn't show a large improvement in goodness-of-fit over (C1), it was chosen as a preferable specification because of its theoretically attractive inclusion of a proxy for substitutability. It implies that both concentration and substitutability have to be 'not small' if tariffs are to affect domestic price.

In this study we are concerned only with the prices of domestically sold output. To get the formula for this from C3, we set $X_i = 0$. We also want the formula to be in terms of proportional rates of change. Holding P_{us} constant, we get

$$dP_{C_i} = 0.979dC_i + 1.365(1+dt_i-dC_i)(3.33H_i)(TRADERAT_i)^{0.09} \qquad (C.4)$$

where 'd' is the proportional rate of change operator. This simplifies and rearranges to equation (3) of section V.

Appendix D: Examination in Detail of Highly-Protected Industries

The model developed in the main body of this paper provides a tool for processing information on a large number of industries to generate quite detailed information on the consequences and costs of protection from import competition.

The sum of the net costs to the Canadian economy, after all intra-Canada transfers have been netted-out, was $740 million in 1978 (sum of figures in column 5, Table 6, Appendix A).

This is a large sum of money, and should be investigated further. The purpose of this Appendix is to report on a case-by-case investigation of some of the industries which turn out to have unusually large costs of protection, according to the model.

Such a case-by-case approach serves two ends:

(a) it yields checked and revised costs-of-protection numbers for the particular industries investigated;

(b) it provides some 'feel' for the overall empirical plausibility of the micro-economic assumptions built-in to the model.

The conclusions that I draw from the case studies that follow are:

(1) The model provides a good representation of economic behaviour in markets in which trade is a significant factor and is not restricted other than by tariffs. Most of the onehundred industries treated in this paper fall into this category.

(2) The model, not surprisingly, is not reliable when tariffs are supplemented by various non-tariff restrictions as trade, such as quotas and subsidies. Industries affected by non-tariff barriers require analysis by case study. This is feasible, given the apparently quite small number of industries involved, and is undertaken in this Appendix.

(3) The model over-estimates the effects of tariff protection on markets in which local producers enjoy a significant natural advantage due to relatively high transport costs. This problem is easily dealt with by dropping such industries from the study.

In this Appendix, the following industries or groups of industries are examined in turn: (1) Clothing Industries; (2) Shoe Factories; (3) Textile Industries; (4) Electrical Products Industries; (5) Shipbuilding and Repair; (6) Soft Drink Manufactures; (7) Fabricated Structural Metal; (8) Miscellaneous Chemical Industries; and (9) Dairy Products.

In total, the industries examined account for $417 million of the 1978 net economic costs of protection estimated by the model -- about 56 per cent of the sum of costs across all industries.

1. Clothing Industries (incl. Knitting Mills)

Industries producing clothing are classified by Statistics Canada into two 2-digit SIC groups; 'Knitting Mills' and 'Clothing Industries'. These two groups were broken-down into their eight 3-digit SIC classifications for the present study.[1] Data on actual 1978 employment, value of production and value of imports (f.o.b.) in these industries, on the levels of these variables should protection be removed, and on the costs of protection, are shown on Table 1. In this section of Appendix D we discuss the various data and assumptions that lie behind the numbers of Table 1.

(a) Protection

As well as relatively high tariff rates of around 25 per cent of the dutiable value of imports, most clothing items have, since 1977, been subject to physical quotas on the quantities brought into Canada.

The quotas were initially 'global' (i.e., non-discriminatory by exporting country), and issued to Canadian importers.[2] This system lead to a loss in the market share of

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1 About 45 per cent of 1978 shipments of industry 2390 came from its 4-digit component 2390, 'Knitted Fabric Manufacturers', which in fact is a textile rather than a clothing industry.

2 This account is taken from Jenkins, (1980, pp. 3-7).

Table 1: Clothing Industries 1978: Employment, Production and Imports with and without Protection

SIC	1978-Actual			1978-without Protection			Proportional Difference			Net economic cost	Value of quota	Net cost incl. quota
	Employment	Domestic production	Imports	Employment	Domestic production	Imports	Employment	Domestic production	Imports			
2310 Hosiery mills	4626	133.7	18.2	4658	134.6	31.0	0.007	0.007	0.703	2.6	2.5	5.1
2390 Knitting mills, except hosiery	15377	588.0	310.8	15121	578.2	440.9	-0.017	-0.017	0.419	20.6	45.3	65.9
2430 Men's clothing	43834	1290.5	133.2	43188	1271.5	260.3	-0.015	-0.015	0.954	18.4	19.1	37.5
2440 Women's clothing	40429	1254.0	139.7	39315	1223.5	277.7	-0.028	-0.028	0.910	19.6	20.1	39.7
2450 Children's clothing	6074	220.8	29.0	5911	214.9	55.7	-0.027	-0.027	0.921	3.8	4.2	8.0
2460 Fur goods	2380	203.2	51.7	2403	201.2	52.5	0.010	0.010	0.027	0.0	0.0	0.0
2480 Foundation garments	3454	88.5	4.2	3499	87.4	13.5	0.013	0.013	2.214	1.7	0.3	2.0
2490 Miscellaneous clothing	3346	96.1	45.6	3122	89.7	69.7	-0.067	-0.067	0.529	3.0	6.4	8.4
Total clothing	119520 (ie. 119,520)	3874.8	732.4	117217	3801.0	1201.3	-0.019	-0.019	0.640	69.7	97.7	167.3

Note: 'Without protection' domestic production and import figures are in actual 1978 prices, so that proportional difference figures represent 'real' changes. Import values exclude duties, production, import, and cost figures are in $millions.

Source: Taken directly or calculated from data in Tables of Appendix A.

the 'higher cost' suppliers to the Canadian market, who accordingly protested politically (esp. the U.S.).

Consequently, the system was changed, from the beginning of 1979, to a bilateral quota arrangement, whereby Canada negotiated limits, with each of the most important seven of the 'low cost' exporting countries, on the numbers of each designated category of clothing that were to be permitted imported into Canada. The allocation of these quotas amongst producing firms was left to the governments of the exporting countries.

Not surprisingly, official or unofficial markets for the buying and selling of quotas have developed in the exporting countries. Jenkins has investigated the prices paid for quotas in the three most important exporters -- Hong Kong, South Korea, and Taiwan -- in 1979. He presents figures for sixteen categories of clothing (1980, Table 2). Since these categories do not, with the exception of 'Foundation Garments' fit into Statistics Canada's 3-digit SIC classification, the present study uses the average of all Jenkins' quota value estimates (ex. Foundation Garments) for all the 3-digit industries.[3] As a proportion of the wholesale value of imports, this number is 0.11. It, and the tariff duty rate, were calculated as a proportion of the Canadian wholesale (i.e., including tariffs and quota charges) price in order to have comparability with the prices of domestically produced output. Thus, our protection rates (columns 2 and 3 of Table 2

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3 Except 'Fur Goods' which are not subject to quota restrictions.

in Appendix A) are lower than the numbers that would be obtained by dividing duties and quota charges by the f.o.b. value of imports.[4]

The clothing quota value data cover a more recent year than 1978, which was the latest available year for Census of Manufactures data. However, this will increase the topicality of our results, since these will incorporate the effects of the currently operative system of non-tariff barriers. Against this, the 1978 import and production data were generated under a protective system in which quotas may have been more or less restrictive than they became in 1979.

(b) Prices

In the model used in this study, it is assumed that, in the absence of protection, Canadian prices of imports would be lower by the full amount of the tariff plus non-tariff equivalent, while the prices of domestic competing output would fall, but by a percentage amount not, in general, as large as the percentage fall in import prices, depending on the degree of substitutability of imported and locally produced products, and on the ability of the domestic industry to take advantage of tariff protection by raising price, without attracting entry from other domestic suppliers.

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4 From 1979, the f.o.b. value of imports will include the quota charge, to the extent that exporters build-in the quota value to their prices. The 1978 data, however, cover a period when the quota was allocated to Canadian importers, and so should not be reflected in f.o.b. import prices, unless import suppliers succeed in capturing some of the rents generated by quota restrictions.

Thus, in the clothing industries, our model predicts a substantial fall in the wholesale price of imports -- about 30 per cent -- and a much smaller decrease -- about 10 per cent (cf. column 4 of Table 2) -- in the price of domestically produced clothing, should protection be eliminated. The relatively small effect on domestic price occurs because the clothing industry is relatively 'atomistic' -- cf. the Herfindahl index, in column 5 of Table 2, for which the mean value for all industries is 0.11 -- so that any attempt to raise price above costs to take advantage of tariff protection would largely be frustrated by new firms entering the industry and competing-away the price difference. Most of the predicted price change is due to the pass-through of lower input costs that would follow elimination of protection on textiles and other inputs.

Because of the importance of the model's assumptions about price-setting to the results, and because they conflict with the traditional 'law-of-one-price' assumption, as used, for example, by Jenkins (1980, figure 2, p. 23), it is worthwhile to examine directly the experience of the clothing industry, to supplement the cross-sectional econometric evidence on pricing produced in Appendix C.

We examine changes in prices over the period since 1976. Table 2 shows year-by-year and 1976-79 percentage changes of price for some relevant series. We see that the selling prices of the Canadian men's clothing industry increased at a lower rate than prices for all manufacturing industries, and about matched

able 2: Percentage Rates of Change of Some Prices

	Industry Selling Price			Wholesale Price			
					Imported		Clothing
	All Manufacturing	Men's Clothing	Textiles	Domestic Clothing	Total	Res-trained	Unres-trained
1976-77	7.9	8.6	5.5	8.9	24.8	22.3	29.5
1977-78	9.2	6.5	6.2	11.2	15.5	22.9	9.6
1978-79	14.4	10.0	13.1	15.9	20.5	24.5	19.2
1976-79	34.8	27.2	26.8	40.4	73.7	87.2	69.2

Sources: Industry selling prices from Statistics Canada, Cat. No. 62-011, December 1980, wholesale prices from Textile and Clothing Inquiry, Vol. 1, Table 34, p. 74.

Note: Industry selling prices are only published for the Men's Clothing sectors of the industry (and for Foundation Garments).

the change in selling prices of their primary input, textiles, over the three years. However, prices of imported clothing rose much more rapidly. The wholesale price index of all imported clothing increased by nearly 74 per cent over the three years. If we assumed that producers in other countries were subject to similar rates of increase in textile prices as Canadian producers, and allow for the devaluation in the Canadian dollar of about 20 per cent, a price increase of about 25 per cent remains to be accounted for. Prices rose even more for clothing from these countries which were 'restrained' in their exports to Canada by the 1979 quotas.

The wholesale prices do not control for 'trading-up' (moving up-market in response to quotas which only specify the quantity, not the quality, of imports -- cf. section (9) below), and so do not give us a reliable indicator of the change in prices of imports of clothing of fixed quality (unlike the domestic

industry selling price indexes), but it seems reasonable to infer from Table 2 that domestic clothing producers were unable to raise their prices to take advantage of the increase in protection over the period.[5]

This inference is supported by the behaviour of clothing industry profit margins on sales, which were 3.6, 2.5, and 2.9 per cent in 1977, 1978 and 1979 (Textile and Clothing Inquiry Vol. I, p. 74), and by the judgement of industry experts in the Department of Industry, Trade and Commerce, who emphasized the 'competitive' (small-scale production , easy entry and exit) nature of the industry.

Thus the 10 per cent fall in domestic clothing industry selling prices predicted by this model seems reasonable, given that most of this is due to the almost complete pass-through of changes in input costs due to removal of protection on inputs (cf. Appendix A, Table 1, column 4) that our pricing formula associates with atomistic industries.

(c) Loss of Capacity

Our model predicts little effect on industry capacity of the squeeze in profit margins that would follow elimination of protection. Only Hosiery Mills and Foundation Garments show a substantial loss (Appendix A, Table 4, column 4). This is because the 10 per cent (more-or-less) fall in selling prices is nearly

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5 Although wholesalers of domestic clothing seemed able to boost prices by more than the increase in the prices they paid domestic producers. Wholesalers may be more concentrated (less 'competitive') than clothing manufactured.

matched by the 8 per cent reduction of clothing industry costs due to elimination of tariffs on the industry's inputs (mainly textiles). From Table 1 of Appendix A we see that full costs (Columns 2 and 3) of the highest-cost plants in clothing industries are all well above 0.9 (except Miscellaneous Clothing), so that if just clothing protection were removed, some plants in these industries would be unable to cover costs and would be forced to exit.

(d) Demand Effect

With no capacity, (supply) effect, the shifts in clothing market size and shares are due entirely (in most clothing industries) to changes in demand induced by changes in prices of imports and domestic output prices, after removal of protection. With import prices falling by around 30 per cent, and domestic prices by around 10 %, it is not surprising that our model predicts substantial increases in import demand, and, in most cases, small but negative changes in domestic production, with the latter due to the own-price stimulative effect of 10 per cent fall in price not being sufficient to compensate for the substitution effect of the approximately 20 per cent changes in prices of imports relative to domestic output.

However, as Table 1 of this Appendix shows, the net effects on domestic production and employment are not very large, as a proportion of 1978 levels of these variables.[6] Only about 2 300 jobs, less than 2 per cent of the actual 1978 total, are lost in the clothing sector, even though imports increase, in real terms, by 64 per cent.

6 The proportional employment and production effects are the same for each industry because of our assumption, in line with empirical evidence, that employment/output coefficients are constant.

While this finding may seem surprising, it does reflect two important characteristics of the clothing industry. First, the degree of import penetration in the sector is not in fact particularly high. In most clothing industries Table 1 reveals that imports held about 10 per cent of the total domestic market in 1978. Without protection, this share would move up, to around 20 per cent. This is in line with the share imports held in the domestic market in 1976, the year before quotas were imposed, which was 22 per cent (cf. Sector Profile: The Canadian Clothing Industry, Table 15, p. 12.

The second characteristic of this (and other) industries is that overall demand does respond to the general level of industry prices. The 'apparent Canadian market' for clothing grew, in physical units sold, at an annual rate of 5.7 per cent between 1971 and 1976. The imposition of quotas lead to a fall in both imports and domestic production in 1977, and, despite some recovery in domestic production, the total market in 1979 was still well below the 1976 peak, having declined since then at an annual rate of 3.9 per cent (Textile and Clothing Inquiry Vol. 1, Table 35, p. 77).

The percentage real increase in the total Canadian market following the abolition of protection would be, according to Table 1 of this Appendix, about 8.6 per cent.[7] The percentage

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7 Calculated as [(3801 + 1201) - (3875 + 732)]/(3875 + 732) x 100.

change in 'units' of clothing would be more -- 18.7 per cent -- given the lower unit value of imports.[8] The number of 'units' of clothing sold would increase from its actual 1978 level of 522 to 623 millions. The 1976 peak was 604 million units, so, given that some population, if not economic, growth has occurred since 1976, the increase in the market following abolition of protection implied by our model seems reasonable.

(e) Substitutability

The shifts in market shares predicted by the model are demand-determined. That is, it is assumed that countries exporting to Canada would have no difficulty in supplying the output demanded.

Since the no-protection import share of the domestic market is similar to the actual level achieved a few years earlier, in 1976, there should be little doubt of the capability of the exporting countries to meet the added demand.

It is true, as noted in (d) above, that imports have tended to supply the 'low' (unit value) end of the Canadian market, but given the flexibility of clothing manufacturers vis-à-vis the 'quality' of their products (cf. Jenkins, 1980, p. 12), it is likely that any changes in product-mix that would be involved in a 64 per cent increase in imports would be easily achieved.

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8 Calculated by applying the proportional changes from Table 1 of this Appendix to the unit-market share data in Table 35 of Textile and Clothing Inquiry, Vol. 1, p. 77.

(f) Costs of Protection

The net economic cost due to the misallocation of resources induced in the clothing industry by protection from import competition is calculated by our model to be nearly $70 million in 1978 (cf. Table 1 of this Appendix). Since there is little rationalisation of production from high-cost to low-cost producers (cf. section (c) above, and column 6 of Table 6 in Appendix A) most of this is generated by consumer surplus lost by consumers not able to purchase clothing at its opportunity cost.

This calculation assumes that the rents generated by non-tariff barriers remain as transfers within the Canadian economy. While this may have been a reasonable assumption under the actual 1978 arrangement whereby quota was doled-out to Canadian importers[9], it is not plausible under the post-1978 system under which the quota is handed-over to the governments of the exporting countries to allocate as they see fit. We have used Jenkin's data on the market prices at which quota are traded in these countries to estimate their tariff-equivalent value. On the probably reasonable assumption that producers in exporting countries build the cost of quota into their prices, all quota rents will be lost to Canada.

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9 Though the behaviour of wholesale prices of imports in 1977 and 1978 (Table 2, this Appendix) may reflect some success on the part of exporting countries to extract some of the rents by raising their selling prices to Canada.

Since the sum of such rents is nearly $100 million a year for the clothing sector (Table 1, this Appendix), inclusion of them in the calculated net cost of protection more than doubles the latter, to $167 million. Adjusting this figure, and the change in employment number, to exclude the part of SIC 2390 which is really a textile industry, our estimate of the total annual costs of protection on clothing, under the assumption that all quota rents are captured abroad, is $137.6 million, in 1978 dollars, and of the number of jobs saved is 2275, giving a net cost per job of $60484.[11]

We should compare these figures with those arrived at by Jenkins (1980). He estimates the total net cost of protection on clothing to be $107.5 million, in 1979 dollars. Most of the difference is due to the valuation placed on the gain to foreign producers due to quota values, which Jenkins puts at $41.1 million (1980, Table 6, p. 37). While Jenkins does not give details of his calculations, it may be that the difference between his number and my estimate of $77.2 million ($97.6 million less an allowance for the textile industry SIC 2391 included in 2390) is due to my procedure of assuming that the quota values found by Jenkins are built-in to all clothing imports, from whatever source. If the

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11 Given the lower rates of protection on textile industries than on clothing industries (cf. Table 2, Appendix A), and that SIC 2391 had about 55 per cent of total SIC 2390 shipments, and 74 per cent of employment, in 1978, we get (after some calculations) figures of $36.2 million for the net costs of protection, and 238 for the number of jobs saved in SIC 2391. Shipments and Employment data are from Statistics Canada, Cat. No. 31-203, 1978, Table 3.

Jenkins number be preferred, then our two estimates of net costs are quite alike.

However, our estimates of the employment impact of protection are very different. Jenkins estimates that the total effect of tariffs and quotas is to increase employment levels in clothing manufacturing by about 13,500 (1980, p. 38). This contrasts with my estimate, noted above, of less than 2300 jobs. The difference is due to Jenkins' use of the law-of-one-price model of industry equilibrium. He has the domestic selling price reflecting in full changes in import prices, and then reflected in changes in the supply of domestic output (he assumes, arbitrarily, a supply elasticity of 1). In my model, domestic clothing profit margins are little affected by import prices, due to the competitive nature of the industry, so there is little squeezing out of domestic capacity from an inability to supply at lower profit margins, when protection is removed. I do have a large gross shift in demand towards imports induced by the change in relative prices, but a good deal of this is compensated for by the overall stimulative effect of lower prices on clothing demand.

Thus my costs per job estimates turn out to be about four times larger than Jenkins' (1980, Table 7). I find that it costs the Canadian economy as a whole about $6 to deliver $1 of wage employment in the Canadian clothing industry.

(g) Changes in Quality

A complicating factor, not quantitatively allowed for in my study, nor by Jenkins (though discussed by him -- 1980, pp. 13-15) is that the specification of quotas in terms of general clothing type ('structured suits', 'shirts with tailored collars', for example) encourages exporters to move up-market within each line -- with only a fixed number of units to be sold, total profits are increased by switching to product lines with higher profit margins.

It would be interesting to evaluate whether the net effect of this system is to increase or decrease estimates of costs calculated under the 'tariff-equivalent' methodology used by Jenkins and in this study, which implicitly assumes a single, homogeneous good.

To the extent that Canadian importers are able to dodge the quotas, for example by finding new 'low-cost' sources of supply not covered by quota restrictions, and by switching to product lines that do not fit the definitions used[12], the impact, and thus the cost, of the quota will be reduced.

On the other hand, the perverse incentive offered by the quota for production patterns to shift contrary to international comparative advantage -- the 'low-cost' suppliers move up-market,

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12 I am informed that the quota on 'sweaters' is not currently binding, since importers have switched to garments made of velour, which are not classified as sweaters.

and Canadian manufacturers move back into the lower end of the market -- must add to the costs as measured.

These changes in market positioning of foreign and domestic suppliers can be clearly traced in the disaggregated import and shipments data. Between 1976 and 1979, the number of suits (ex. knitted) imported fell by 33.3 per cent, while their unit value rose by 80.4 per cent. Over the period 1976 to 1978 (the last year available), the number of suits shipped by Canadian manufacturers increased a little (by 7.5 per cent) and their unit value rose by only 6.5 per cent, whereas the (constant-quality) domestic selling price index for suits (wool or wood mixtures) rose by 19.8 per cent. Imports of men's shirts (ex. knitted) fell, in units, by 28.5 per cent 1976-79, and their unit value rose by 52.7 %, while over 1976-78 the unit value of domestically produced shipments rose 13.3 % while their price index rose by 21.2 %.

These data show a clear tendency for domestic suppliers to move down market and for imports to increase their share of the higher-quality (higher unit value) end of the clothing industry.

2. Footwear

Industries producing footwear are classified by Statistics Canada into one 3-digit SIC industry, No. 1740, 'Shoe Factories'. Data on employment, value of domestic production, value of imports, and net cost of protection for 1978, and following removal of protection, according to our model, are shown on Table 3.

(Table 3 on separate sheet)

Table 3 reports that Canadian employment and production would fall by more than 11 per cent should all protection be removed and that imports would increase in real terms, by nearly 59 per cent. In the rest of this section, we discuss the data and assumptions that lie behind the numbers of Table 3.

Table 3: Footwear Industry 1978: Employment, Production and Imports with and without Protection

1978-Actual			1978-without Protection			Proportional Difference					
Employ-ment	Domestic production	Imports	Employ-ment	Domestic production	Imports	Employ-ment	Domestic production	Imports	Net economic cost	Value of quota	Net cost incl. quota
15169	469.5	212.3	13436	415.9	337.0	-0.114	-0.114	0.587	16.3	30.3	46.6

Note: 'Without protection' production and import figures are in actual-1978 prices, so that proportional difference figures represent 'real' changes. Import values exclude duties. Production, import, and cost figures are in $millions.

Source: Taken directly or calculated from data in tables of Appendix A.

(a) Protection

Tariff rates on most imported footwear items are between 24 per cent and 25 per cent of the assessed f.o.b. value,[13] or about 20 per cent of the landed (f.o.b. + duty) value. As well, global quota restrictions on all important footwear lines except canvas footwear were imposed in late 1977, and remain in force. The tariff equivalent of the quota restrictions was put at 10 per cent of the landed value in this study, giving a total rate of protection of 0.298 (Appendix A, Table 2). That is, we predict that the landed value of footwear imports would fall, on average, by about 30 per cent, if all tariff and quota restrictions on imports were abolished.

Doubts have been expressed about the effectiveness of the footwear quotas. Unpublished econometric analyses by the Department of Industry, Trade and Commerce could find no strongly significant evidence of imports being fewer than they would have been without the quota (though the shortness of the available period of observation reduces the reliability of econometric methods). Total imports did fall from their 1976 peak of 47.7 million pairs to 41.4 million in 1979 (Anti-Dumping Tribunal Report Table 3-4, p. 52), but factors such as the devaluation of the Canadian dollar and the general decline in the footwear market are believed to have been important. In fact the total quota allotment

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13 Since 1975 imports from a number of countries have been subjected to a series of 'value for duty advances', under which arbitrary upward adjustments are made to the f.o.b. value of the footwear before the duty is assessed. (Anti-Dumping Tribunal Report, Appendix C, p. 138.)

has, on average, been only about 80 per cent utilised over the three years that the system has been in operation (Anti-Dumping Tribunal Report, p. 49).

However, difficulties in shifting quota between product categories, and its non-transferability between importers (to whom quota was allocated on the basis of their 1976-77 import levels) have impeded the use of quota. The Anti-Dumping Tribunal concluded that

> 'the administrative burdens and other costs associated with the quota, when combined with other factors (i.e., duty rates, exchange fluctuations and value for duty advances), have afforded the domestic industry considerable protection.' (Report, p. 49).

The Tribunal reports that estimates of the value of quota by participants at its hearings were 'in the area of $1 to $2 per pair' (Report, p. 98). Given that the average unit f.o.b. price of imported footwear was $6.21 in 1979 (Report, Table 3-5, p. 53), and adding on the 24 per cent tariff, the implied tariff equivalent of quota would be between 12 and 25 per cent of the landed price. If valid, such figures suggest that the 10 per cent tariff equivalent used in this study is too low. However, given that the utilisation of quota varied considerably between product lines (Report, Table 3-1, p. 48), it may be reasonable to assume that quotas were indeed not binding over all types of footwear, in which case our 10 per cent figure should be a reasonable number for the 'average' impact on imported footwear.

(b) Prices

The model predicts a 29.8 per cent fall im import prices following the removal of all protection, and a 8.3 per cent fall in the industry selling price of domestically produced footwear (Appendix A, Table 2). Most of the 8.3 per cent is due to the reduction in materials costs that would follow abolition of protection on input-supplying industries (cf. Appendix A, Table 1, column 4), so that the induced effect on domestic prices of the protection on footwear imports alone is estimated to be less than 3 per cent (8.3 - 5.6 = 2.7).

As with the clothing industries discussed in section 1 of this Appendix, the small domestic selling price effect is due to the 'atomistic' or competitive nature of the industry. There were 156 footwear manufacturing plants in Canada in 1978, and each one employed, on average, about 100 workers.[14] The Tribunal has noted (pp. 15, 100) that it is easy for small manufacturers to enter into and exit from the industry. Thus, as with clothing manufacturers, we expect domestic prices to be set to give some perceived 'normal' rate of return to producers, with this maintained by changes in the number of firms when market conditions alter.

Actual changes in prices are shown in Table 4.

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14 Report, Table 2-1, p. 15, and Table 2-2, p. 16.

Table 4: Percentage Rates of Change of Some Prices

	Imports			Industry Selling Price	
	Unit Value	Due to Product Mix	Constant Mix Price	Shoe Factories	Leather Tanneries
1976-77	21.4	1.6	19.8	7.0	10.7
1977-78	11.7	-10.8	22.5	7.1	21.9
1978-79	22.5	-1.2	23.7	18.1	48.3

Sources: Imports calculated from data in the Anti-Dumping Tribunal Report, Table 3-5, p. 53. Industry selling prices from Statistics Canada No. 62-011, December 1979.

In Table 4, the annual changes in unit values ($/pair) of footwear imports are decomposed into changes due to changes in the product mix of imports (a positive value indicates a shift towards higher value footwear), and changes due to changes in prices of footwear of a given product type (constant-mix). The import price changes can be compared with changes in the selling price index of domestically produced footwear. It can be seen that between 1976 and 1979, import prices rose much more than domestic output prices, which failed to keep up with increases in the price of the industry's most important input; leather.[15] Over the three years, the imported footwear price index rose almost 80 per cent, and the domestic industry's selling price by 35 per cent. Of the difference, perhaps 20 points are due to the devaluation of the Canadian dollar,[16]

15 About 2/3 of the domestic shoe factory industry's material inputs come from the domestic Leather Tanneries industry.

16 Cf. Report, Table 3-3, p. 51.

and the rest to factors such as higher rates of cost increase in the exporting countries and the effects of the quota. There is no evidence of domestic manufacturers being able to take advantage of the higher import prices to raise their own selling prices.

As with clothing industries, this inference is supported by the behaviour of profit margins over recent years. The ratio of (net) profits to sales dropped in 1977 and 1978, then recovered in 1979 to just below its 1976 level (Report, Table 2-12, p. 26). The variations in margins are probably explainable largely in terms of variations in capacity utilization rates (cf. Report, Table 2-9, p. 23).

(c) Capacity Effects

The small effect on industry prices (net of input price changes) of removal of protection predicted by our model means that no plants are closed-down by the squeeze in profit margins (Appendix A, Table 4, column 4). Again, this matches our predictions for the clothing industry.

(d) Demand Effects

With no capacity, or supply, effect on domestic footwear output, all changes work through the demand side. Since import prices fall by more than 20 points more than domestic industry prices, it is not surprising that some demand is switched from domestic to imported sources. As well, the lower prices encourage a general increase in demand for footwear.

The net result is shown on Table 3 -- an 11.4 per cent fall in domestic real production, and a 58.7 per cent increase in the quantity of imports. The import market share in value (before duties) changes from its actual 1978 level, 31.1 per cent, to 44.8 per cent. In volume terms, given the actual 1978 import share of 56 per cent (Report, Table 1-1, p. 8), import penetration without protection (assuming no change in product mix), would be 69.5 per cent. This is considerably larger than the peak import market share actually achieved in 1977 -- 58 per cent -- but, of course, is predicated on the assumption that all protection is removed.

In total units, the Canadian market would increase from its actual 1978 level of 78.6 million pairs to 100.6 million pairs. This would represent per capita annual consumption of 4.25 pairs. The highest annual consumption level actually achieved in the last decade was 4.00, in 1972 (Report, Table 4-1, p. 68). Given that per capita incomes have increased since 1972, an estimate of 4.25 pairs per capita seems reasonable, though a full examination of trends in tastes, and of changes in prices, would be needed to confirm this.

(e) Substitutability

We must check that the substitution towards imports after abolition of protection that is predicted in our model would be feasible, given the capabilities of exporting countries to supply the Canadian market.

There seems to be little doubt about the ability of exporters in other countries to increase their share of the Canadian market by the order of magnitude predicted in this study. In their submissions to the Anti-Dumping Tribunal, the Shoe Manufacturers Association of Canada suggested, first, that traditional distinctions between "dress" and "casual" footwear were being eroded by fashion changes (Report, p. 90) and, secondly, that, in every important product category, imported footwear can be landed in Canada at significantly lower cost than the Canadian-made equivalent (ibid.).[16] That is, substitution elasticities of both consumption and production are high.

While the Tribunal did not fully accept what it called the 'shoe is a shoe' philosophy (Report, p. 106), it did conclude that

> "Imports of leather footwear from (the newly industrialized countries) now compete directly in the middle price points of the Canadian footwear market, where Canadian producers direct about 90 per cent of their product. In the absence of import restraints (i.e., quotas) the ability of the domestic market to retain even its present share of the market would be seriously threatened, (Report, p. 109).

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16 It is a source of some wonder to a naive economist, that such statements can be made in support of requests for maintenance of protection.

It might be asked whether the no-protection import share predicted by our model is too low, given the admitted price advantage of imports. However, domestic manufacturers have certain other advantages -- shorter lead times, easier filling of repeat orders (Report, p. 87) -- which probably guarantee the domestic industry some role in supplying most product categories. As well, there are certain specialty areas, notably winter footwear, in which Canadian producers may even have a comparative advantage. About 8 per cent of domestic production (in pairs) was exported in 1978, mostly in the 'special' purpose footwear category which includes work boots and winter boots (Report, Table 4-6, p. 74).

(f) Costs of Protection

The net cost of protection on footwear in 1978 is calculated by our model to be $16.3 million, or about 3 per cent of the domestic industry's 1978 value of production (Table 3). This is the loss to consumers from the higher prices ($100.9 million) less tariff revenues ($49.0 million), and higher profits ('rents') from protection going to Canadian manufacturers ($35.6 million), as set out on Tables 5 and 6 of Appendix A.

In the case of the clothing industries, it was argued that the estimated value of quota should be added in to the net cost figure to get the true magnitude of the losses to Canada of protection, on the grounds that, since clothing quotas are handed over to the exporting countries, their value will be built in to the price paid to these countries for clothing imports.

The footwear quota is administered in Canada by the importers to whom it is allocated. However, given the inflexibility of the system, costs will be incurred by importers and retailers trying to adapt the rigid quota allocation to fluctuating market conditions (cf. Report, p. 98). Such costs are pure waste, and should be included in the costs of protection.

Given the estimated value of footwear quota of $30.3 million (=[212.3 x 0.10]/[1 - 0.298]), an upper-bound estimate of the total costs of protection is $46.6 million (Table 3).

The protective effect on employment of tariffs and quotas is estimated by our model to be 1733 jobs, or 11.4 per cent of the 1978 workforce. Thus our estimates of the cost-per-job range from $9 400, assuming that all quota value is captured domestically as profits, to $26 900, on the assumption that all quota value is dissipated in higher domestic costs. In terms of cost per dollar wage, the lower and upper bounds are 0.94 and 2.69. That is, it apparently costs somewhere between one and three dollars to deliver a dollar of wage income in the Canadian footwear industry, using tariff and quota protection.

(g) Changes in Quality

In contrast to the Clothing case, there is no strong evidence of quotas inducing 'trading-up' to higher unit value imports. Indeed, Table 4 shows that, according to the Anti-Dumping Tribunal's calculations, the product mix of imports actually shifted slightly down-market between 1976 and 1979. This may be

due to the increase in imports of canvas footwear (not subject to quota) over the period, and the Tribunal accepted pieces of evidence citing individual instances of trading-up, (Report, p. 53). We do not have, it seems, sufficient information to assess the significance of changes in product mix for our calculations of the impact of protection.

3. Textiles

The 2-digit SIC 'Textile Industries' was broken down into ten 3- and 4-digit SICs in this study. Data on employment, domestic production, imports, and the cost of protection are shown on Table 5.

In this Appendix we will focus on the three yarn and cloth industries and the carpet, mat and rug industry. The other industries are relatively small with the exception of the combined automotive fabric and miscellaneous textiles industries. Trade in automotive fabrics is affected by the auto pact so that measured tariff rates do not give a reliable indication of the degree to which the domestic industry is protected.

(a) Protection

Evolution of technology in textile manufacture towards more highly automated and capital intensive processes has resulted in a large and increasing proportion of world trade being between developed countries. The share of Canadian textile imports from 'low-cost' sources over 1976-78 was 27 per cent, down from 32 per cent a decade earlier (Textile and Clothing Inquiry, Vol. 1, Table 13, p. 39). Thus, Canadian producers are competing largely with foreign producers facing similar labour and other costs.

Table 5: Textile Industries 1978: Employment, Production and Imports, with and without Protection

SIC	1978 - Actual			1978-without Protection			Proportional Difference			Net economic cost
	Employment	Domestic production	Imports	Employment	Domestic production	Imports	Employment	Domestic production	Imports	
1810 Cotton yarn and cloth	8739	444.9	180.4	0.0	0.0	715.2	-1.000	-1.000	2.965	14.8
1820 Wool yarn and cloth	4953	193.4	83.0	4777	186.5	114.7	-0.036	0.036	0.382	6.3
1830 Man-made fibre, yarn, cloth	5760	973.5	535.8	4367	738.1	954.0	-0.242	-0.242	0.781	42.0
1840 Cordage and twine	482	19.8	37.6	237	9.8	51.4	-0.507	-0.507	0.367	0.3
1851 Fibre processing	032	24.1	52.2	607	23.1	55.8	-0.040	-0.040	0.069	0.8
1852 Felt mills	585	27.4	1.3	561	26.3	5.2	-0.040	-0.040	3.000	1.0
1860 Carpets, mat, rug	7150	464.9	56.4	6601	429.2	142.9	-0.077	-0.077	1.534	11.2
1891 Thread mills	868	42.0	10.3	741	35.8	23.4	-0.147	-0.147	1.272	1.4
1892 Narrow fabrics	2295	66.7	21.8	2089	60.7	37.5	-0.090	-0.090	0.720	2.6
1880 Auto fab. and misc. 1899 textiles nes	17567	904.2	209.0	17960	924.4	307.6	0.022	0.022	0.472	18.5
Total textile	49031	3160.9	1187.8	37940	2433.9	2407.7	-0.226	-0.230	1.027	98.9

Note: 'Without protection' domestic production and import figures are in actual-1978 prices so that proportional difference figures represent 'real' changes. Import values exclude duties. Production, import and cost figures are in $millions.

Source: Taken directly or calculated from data in Tables of Appendix A.

Two main factors (apart from tariffs) seem to affect the success enjoyed by domestic producers in competing with imports. In their favour, there is the preference of domestic clothing manufacturers (the main market for textiles) to buy from Canadian textile suppliers because of the associated gains in flexibility (cf. ITC Sector Profile, Clothing, p. 8).

Against Canadian producers runs the difficulty in exploiting economies of scale without tariff-free access to the much larger US or EEC markets (Textile and Clothing Inquiry, Vol 1, p. 37).

Both of these factors reinforce the importance for textiles of the viability of the domestic clothing industry -- as a natural market for local output, and as a base for getting production up to levels at which scale economies can be exploited. In this study, we have not been able to allow for the indirect effects of protection on other domestic industries, since this would involve building a full general equilibrium model -- not feasible within the time constraints of the study.

Turning to the direct protection received by the domestic textile industry through tariff and non-tariff protection on competing imports, we may note, that rates of protection, though lower than those applied to clothing imports are still quite high, being around 15 per cent of the value of the commodities including duty. Within industries, tariff rates vary, being higher the more highly processed the product. For example, within SIC 1830

Manmade Fibre, Yarns, and Cloths), duty rates (as a proportion of f.o.b. values) are about 10 per cent for fibres, 15 per cent for yarns, and 25 per cent for fabrics.

Many textile products are subject to quota restrictions, and the value of these has been put at 5 per cent in our model (Appendix A, Table 2). This figure is probably too high, since many of the quotas are not currently binding, possibly due to the relative high growth rates in imports that they permit.[17]

(b) Prices

The model predicts a relatively large response of domestic prices to changes in import prices in the cotton and man-made yarn and cloth industries, due to the relatively high levels of concentration in these industries (Appendix A, Table 2). Concentration is particularly high for individual products -- the process of rationalization in order to exploit scale economies has proceeded to the point where many products are now produced in Canada, by just one or two firms (Textile and Clothing Inquiry, Vol. 1). Under these market conditions, we should expect domestic sellers to be able to take advantage of tariff and other protection

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17 The fifteen or so items added to the list of quota-restricted imports in 1979 were permitted to grow at 10 per cent per year. These high rates seem to have been aimed at facilitating the negotiation of the much more restrictive bilateral clothing quotas, by boosting the apparent allowed rate of growth of the total clothing and textiles import market.

in their pricing behaviour. This seems to be the case. For example, the industry selling price of nylon yarn rose 20.6 per cent between 1976 and 1979, while the unit value of imported nylon yarn, including duty, rose by 20.3 per cent.[18] Table 6 shows annual percentage changes of prices for textiles as a whole.

Table 6: Percentage Price Changes in Textiles

	Imported Textiles	Industry Selling Price	Textile Inputs		
			Cotton	Wool	Man-made
1975-76	6.3	7.5	18.7	2.3	6.6
1976-77	7.4	5.5	-22.8	12.1	2.3
1977-78	16.2	6.2	7.3	11.1	3.0
1978-79	12.5	13.1	23.1	14.8	13.9

Sources Calculated from data in Textile and Clothing Inquiry, Vol 1, Tables 9 and 10, pp. 33-34.

Table 6 does not give grounds for any firm conclusions, but there are signs that the selling price of domestic producers roughly follows that of imported textiles with a one-year lag (the 1977-80 change in the industry selling price was 12.8 per cent), but does not have a discernible relationship with input price changes.

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18 Calculated from Statistics Canada data. Nylon yarn is the only product in SIC 1830 for which there is a match between the industry selling price and the import unit value product definitions.

This inference is supported by the behaviour of profit margins, which rose by about 50 per cent in 1979 over 1977-78 levels (Textile and Clothing Inquiry, Vol.1 Table 11, p. 35), in contrast with the experience of the more competitive' (in the sense of mobility of capital) footwear and clothing industries, which, we noted above, showed little change in profit margins when import prices changed.

For the Carpet, Mat, and Rug industry (SIC 1860), our model does not predict such a large response to changes in import prices, since concentration is below average in this industry. I am informed by an industry expert that the Canadian carpet industry does not fully price up to the tariff -- that is, raise its prices to just match the tariff-paid price of competing imports.

(c) Changes in Capacity

The large (relative to clothing and footwear) changes in domestic selling price that would be induced by an elimination of protection on textile imports tend to have a large effect on domestic capacity. With a 20.9 per cent fall in price (Appendix A, Table 2, column 4), none of the Canadian cotton yarn and cloth plants (SIC 1810) are able to cover costs (Appendix A, Table 1, column 6), so that they are all wiped-out (Appendix A, Table 4, column 4).

The smaller and less concentrated wool yarn and cloth industry (SIC 1820) only faces a 9.1 per cent fall in price, and loses about 14 per cent of its highest-cost output, most of which is made up for by the expansion of lower-cost plants (Appendix A,

Table 4, columns 3, 4, 6, 7).

The man-made fibre, yarn, and cloth industry (SIC 1830) loses about 45 per cent of its capacity from a 10.5 per cent squeeze on price, butgets more than half of this back from expansion of surviving plants.

How plausible are these predictions? Of the three industries, cotton has the highest share of its imports coming from 'low-cost' sources (Textile and Clothing Inquiry, Vol 1, Table 13, p. 39, and has the smallest range between highest-cost and lowest-cost plants (Appendix A, Table 1, columns 5 and 6), so it appears that its technology is relatively easily accessible, so that costs may depend particularly on prices paid for factors of production, such as labour. Therefore it is plausible that a 20 per cent cut in price would have a severe effect on the industry, though complete wiping-out is unlikely -- some niches in the market that could still be profitably served by domestic producers would remain.[19]

Our model probably understates the protection needed by the woollen yarn and cloth industry. There are two main activities undertaken in the industry -- manufacturing 'woollen' and 'worsted' fabrics. The first of these is dominated by four firms, and the second by just two (Textile and Clothing Inquiry, Vol. 2, pp. 33, 37)

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19 For example, one of the five companies in the fabrics segment of the industry is involved in 'finishing huck towelling for industrial use (Textile and Clothing Inquiry, Vol. 2, p. 29). Perhaps this company (and other firms involved in finishing activities) would remain viable, or even benefit, after a reduction in fabric prices.

so it seems that our Herfindahl index understates the true levels of concentration, and thus understates the effect that a removal of protection would have on domestic industry selling prices. The worsted segment is particularly susceptible to competition from low-cost sources, who are now the price leaders ... Canadian producers must meet these prices, or lose even more market share' (Textile and Clothing Inquiry, Vol 1, p. 47).

In the man-made textiles market, only about 12 per cent of imports are from 'low-cost' countries, due, as noted above, to the capital-intensive, high-technology, production methods used in the industry, which prevents less developed countries from using their low wages to advantage.

The Canadian man-made textiles industry managed to export about 12 per cent of its 1978 production, a larger proportion than any other Canadian textile industry except for the small fibre processing industry, SIC 1851 (Appendix A, Table 3).

It is difficult to assess whether the 45 per cent squeeze on high-cost capacity that our model predicts as a consequence of a 16.5 per cent price cut is likely to be an under- or over-estimate, especially given the fact, noted in section (a) above, that within the industry, rates of protection are different on fibres, yarns, and fabrics.

In the carpet, mat, and rug industry (SIC 1860), the model predicts that about one-third of 1978 domestic capacity would be squeezed-out by elimination of protection. This figure is probably too high, since our protection data include a 5 per cent tariff-equivalent for non-tariff barriers, whereas imports of carpets are apparently not subject to quota restraint (Textile and Clothing Inquiry, Vol. 1, p. 22). Thus the actual fall in domestic prices would probably be about 10 per cent, rather than the 12.8 per cent predicted in the model, and the loss of high-cost capacity smaller.

(d) Demand Effect

The cuts in price following elimination of protection should boost demand for both imported and domestic textiles. Since, compared to clothing and footwear, domestic prices follow more closely changes in import prices, the change in relative import/domestic prices is less, and thus the tendency to substitute towards imports smaller. Accordingly, we find that the net effect of the price changes on demand for domestically produced textiles is in all cases positive, in contrast to most of the clothing industries (Appendix A, Table 4, column 3). What should be queried is the size of the price effect on demand. Because market demand elasticities are taken from 2-digit SIC studies, only one number -- 0.75 -- is used for all the textile industries (cf. Appendix A, Table 2, column 7). This is almost certainly incorrect. Most of these industries produce goods that are used as inputs by

other industries, the most important being the clothing industry (Textile and Clothing Inquiry, Vol. 1, p. 76). The effect on demand of the price drop of an intermediate input is an indirect one -- by lowering the costs of the purchasing industry, it induces the latter to cut its price, and therefore sell more.

However, unless the intermediate good is the only input used in the final product, the effect of its price change will be diluted. For example, 'materials and supplies' made up about 60 per cent of total purchased inputs of the whole 2-digit Clothing Industries (the other purchased inputs being labour and energy). Thus, even if all materials and supplies came from the textile industry, a 10 per cent cut in textile prices would only lower total clothing industry costs by 6 per cent.

Therefore, the price elasticity of demand for textiles should be less than the elasticity for clothing, but in our study the two are given as the same 0.75. So, unless the clothing elasticity is too small[20], our figure for most textile industries will be too large.

On the other hand, the -0.75 number may well be too small for an industry like SIC 1860 (carpets, etc.) which produces a consumer good that is probably at the 'luxury' end of the market for many buyers.

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20 Jenkins uses a figure of -0.5 for the market price elasticity of clothing demand, though without any independent supporting evidence (1980, p. 27).

If these biases are present, then the predicted increases in sales of imports and domestic output (Appendix A, Table 4) will be over-estimates for the yarn and cloth industries, and will under-estimate the stimulus to the demand for carpets.

(e) Substitutability

The substantial squeezing-out of high-cost capacity in the yarn and cloth industries that would follow elimination of production leads, in our model, to substantial switching to imports and low-cost domestic suppliers (Appendix A, Table 4, columns 4, 5 and 6).

Since Canada is a small part of the total world textile market, and since import penetration appears to occur over all the main product classifications (cf. Textile and Clothing Inquirty, Vol. 1, pp. 40-48), it seems perfectly plausible to assume that supplies of imports would be available to meet the extra demand for them, with the likely exception of the cotton yarn and cloth industry, in which, as noted in (c) above, it is likely that some corners of the domestic market would remain best served by domestic producers, rather than the 100 per cent wiping-out of the industry indicated by the data on costs and prices.

What about the expansion of lower-cost domestic suppliers into part of the market vacated by the squeezed-out firms? While we probably should not doubt, in general, the suitability of the

products of the surviving firms, we must question their capacity to expand their production of these products by the amounts predicted in the model. For the largest yarn and cloth industry -- SIC 1830 (man-made textiles) -- the model gives an expansion, due to the combined effects of lower prices and entry into the former markets of high-cost firms, from $531.8 million (=973.5-441.7) to $775.0 million (=531.8 + 81.2 + 162.0) - increase of 40 %.

Given that capacity utilization in the textile sector in 1978 was calculated to be 93.5 per cent (Textile and Clothing Inquiry, Vol. 1, Table 7, p. 28), it is obviously most unlikely that the surviving low-cost firms could increase their output by 46 per cent with their existing plant. However, we could expect that much of the capital stock of the existing firms would be bought-up, at written-down prices, by the survivors. As well, the same effect would be achieved if the pressure of lower prices induced higher-cost firms to look for and find ways of reducing their costs (reductions in 'X-inefficiency'). Finally, over a longer time period, the low-cost firms could invest in new capital equipment.

Perhaps only a detailed micro-level case study of this industry (and of others, such as Carpets, Mats, and Rugs in which large shifts in sources of supply are predicted by the model) could reliably resolve the extent to which intra-industry rationalization is feasible (and desirable).

(f) Costs and Employment

Table 5 shows that the total net economic cost of protection in the textiles sector is $98.9 million, in 1978 dollars, for which 11 091 jobs are saved.[21] That is, it cost the Canadian economy as a whole about $8 900, in 1978, for each job saved, or about 75 cents to protect one dollar of wages, given the average 1978 wages and salary of $12 000 in this sector. Table 7 of Appendix A shows that costs/job are much lower than this average figure in the cotton yarn and cloth, simply because the model predicts that all this industry's employment depends on protection, and are higher for all the other 3 and 4-digit segments of the industry. In fact, nearly 79 per cent of the jobs saved are in the cotton, yarn and cloth industry.

Comparing columns 5 and 6 of Appendix A, Table 6, we see that, for the larger industries, the production waste costs associated with output coming from relatively high cost protected domestic suppliers exceeds the overall net economic cost. This occurs because the net consumption efficiency gain from removing protection (i.e., the gain to consumers net of transfers to government (tariffs) and producers (profits)) is negative, due to the welfare loss associated with the loss of consumer choice when the high-cost suppliers are forced out (Appendix A, Table 5, column 4) being larger than the 'welfare triangles' that appear when prices are reduced to opportunity costs.

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21 To these numbers could be added the figures for those segments of the Knitting Mills industry (SICs 2310, Hosiery Mills, and 2391, Knitted Fabric Manufactures) which are often classified as 'textiles'.

If, in fact, there is a high degree of substitutability between alternative sources of supply, as suggested in section (e) above, then these loss-of-choice losses could be over-estimated by the model, and thus the true net costs of protection understated.

Although outside of the cotton yarn and cloth industries the net employment effects of protection are small, the incidence of protection within industries reveals larger gross employment impacts. In Appendix A, Table 7, columns 2 and 3 show that a total of 19 082 specific jobs (in high-cost firms) are actually 'saved' by the protection, but employment levels of low-cost firms are 7 992 lower than they would be without protection. That is, the protection of high-cost firms' jobs is at the expense of employment in lower-cost segments within each textile industry, as well as at the expense of the economy at large, which pays more for its textiles.

4. Electrical Products Industries

There are nine 3 or 4 digit SIC industries in Statistics Canada's 2-digit grouping 'Electrical Products Industries'. Table 7 gives the actual 1978, and without protection data on employment value of production, value of imports, and the net economic costs of protection, for these industries.

(Table 7 on separate sheet)

Table 7: Employment Production, Imports and Costs of Protection: Electrical Products Industries

SIC	Actual - 1978			Without Protection			Proportional Difference			
	Employ-ment	Value of production	Value of imports	Employ-ment	Value of production	Value of imports	Employ-ment	Value of production	Value of imports	Net economic costs
3310 Small electrical appliances	5181	262.2	262.8	4629	234.3	348.4	-0.107	-0.107	0.232	4.6
3320 Major appliances	12806	697.5	216.6	13387	729.1	256.8	0.045	0.045	0.186	5.5
3330 Lighting fixtures	3928	190.6	118.1	3802	184.5	143.4	-0.032	-0.032	0.214	4.1
3340 Radio and T.V.	2332	170.5	583.9	2293	167.7	623.4	-0.017	-0.017	0.068	2.3
3350 Communications Equipment	37895	1556.5	907.9	36531	1500.5	1123.6	-0.036	-0.036	0.238	21.0
3360 Electrical industrial equipment	27150	1156.6	517.0	25515	1086.9	694.3	-0.060	-0.060	0.343	19.9
3380 Electrical wire and cable	9036	828.4	50.9	8990	824.2	125.7	-0.005	-0.005	1.470	25.8
3391 Battery manufacturers	3026	175.1	63.3	2992	173.1	83.6	-0.011	-0.011	0.321	3.9
3399 Miscellaneous electrical	12925	489.5	260.7	12983	491.7	303.8	0.004	0.004	0.165	4.7
	114279	5526.9	3001.2	111122	5392.0	3703.0	-0.028	-0.024	0.234	91.8

Note: 'Without protection' domestic production and import figures are in actual-1978 prices so that proportional difference figures represent 'real' changes. Import values exclude duties. Production, import and cost figures are in $millions.

Source: Taken directly or calculated from data in Tables of Appendix A.

The three largest industries, in terms of value of production -- SICs 3350, 3360, 3380 -- have net costs of protection much larger than those estimated for any of the other industries. In this section we will examine the results for these three industries, in turn.

(a) Communications Equipment Manufacturers (SIC 3350)

This is an industry heavily involved in trade, mainly with the United States (non-tariff barriers have restricted trade with other countries). The model predicts that the 15 per cent tariff rate (13.5 per cent on the value of imports including tariff duties) would be almost completely matched by a cut in domestic industry selling prices. (Appendix A, Table 2, columns 2,4) given that the industry is highly concentrated (the telecommunications segment is dominated by one firm -- Northern Telecom).

The results of such substantial price cuts, with little change in relative import/domestic prices, are (a) a boost in demand for both imports and domestic output and (b) a 'squeezing-out' of about 20 per cent of the domestic industry's (highest-cost) capacity (Appendix A, Table 4). More than half of the sales of squeezed-out plants are picked up by surviving domestic plants, with the net effect of the demand and capacity changes being a 3.6 per cent fall in domestic employment and production (Table 7, above).

I do not have the information to assess whether these intra-industry shifts in source of production are reasonable. This depends on (a) the substitutability between imports and domestic output, and (b) the ability of lower-cost plants to expand to take up their share of the customers given up by the exiting plants. We can note that the industry has grown fairly rapidly recently, implying an ability to expand capacity over the medium to long terms, and that the pressure on price could induce some higher-cost firms to increase their operating efficiency by cutting costs, and thus remain in business.

However achieved, the rationalization of domestic production would save $36.4 million a year (Appendix A, Table 6, column 6). This is larger than the net economic costs of protection ($21.0 million) because of the inferred consumer losses from the reduced variety of sources of supply available when domestic capacity is squeezed. To the extent, that such consumer losses are temporary 'adjustment' costs, and/or that the production cost savings are achieved by improvements in the operating efficiency of higher-cost plants, the long-run or 'permanent' costs of protection will be higher than $21.0 million.

(b) Electrical Industrial Equipment (SIC 3360)

Tariffs in this industry are similar to those imposed on communications Equipment (about 15 per cent). However, SIC 3360 is a relatively unconcentrated industry overall, and so the model predicts that less than 60 per cent of a cut in the rate of protection on imports would be reflected in a fall in domestic industry prices.

The net effect of the price changes is a quite small increase in the demand for domestic output, and a larger change in import demand. On the supply side, the 8 percent fall in domestic price makes unprofitable the operations of about 20 per cent of domestic plants, of which the sales get picked up in approximately equal proportions by imports and surviving domestic plants, with the net effect on the domestic plants being a 6 per cent fall in employment and production.

Examining in commodity detail the composition of imports and domestic production revealed some substantial differences in the extent of import penetration. The ratio of imports to domestic production ranged from around 1.3 for generators and motors to 0.5 for industrial control equipment, to about 0.2 for transformers and switchgear equipment.

However, both imports and domestic suppliers appear to be represented in all product categories, and it does seem reasonable to expect that the sort of import-domestic and highest-low cost shifts in sources of supply predicted by the model could be handled by the industry.

As with Communications Equipment, we should note the possibility of increased competitive pressure inducing improvements in costs levels of the highest-cost producers; thus reducing the amount of intra-industry dislocation needed to adjust to loss of protection. The Sector Profile by the Department of Industry, Trade, and Commerce of the Electrical Products Industry reported

that, in 1972, primary factor (labour and capital) productivity in this industry was 12 per cent lower than in the United States. Although the productivity difference may have narrowed since then, there may still be room for improvements to be realized by greater competitive pressure along with a rationalization of output towards lower-cost plants.[22]

The predicted higher production costs due to protection exceed the net economic costs (Appendix A, Table 6, columns 5,6) as in the case of Communications Equipment, this is because of consumption losses from loss of variety, and the same qualifications apply.

(c) Electric Wire and Cable (SIC 3380)

Tariff rates in this industry average nearly 10 per cent, their elimination would lead, according to the model, to a greater than 11 per cent fall in domestic selling prices and a 26 per cent cut in domestic capacity.

These numbers are almost certainly too large. Imports (and exports) in this industry were only about 6 per cent of total production in 1978. The industry has a natural barrier to trade -- the low value per pound of its output (cf. Towards the Electrical Economy, Annex A, p. 3) -- and it is most unlikely that a 10 per cent cut in the price in the small proportion of the wire and cable

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22 The ITC publication Towards the Electrical Economy (November 1980) notes the high degree of foreign ownership in this industry, and the room (and need) for rationalization within multinational firms (p. 46).

market that is imported would have such a large effect on the prices in the majority of the market that is supplied by domestic producers.

Therefore, the model's estimates of the effects and costs of protection will be much too large.

Of more consequence than international trade barriers may be the interprovincial restrictions on the pattern of production imposed by the pressures of provincially-owned utilities on the location decisions of producers, which have resulted in wire and cable production facilities being located in every province but one (Towards the Electrical Economy, Annex A, p. 3).

5. Shipbuilding and Repair

This 3-digit industry (SIC 3270) is one of the most heavily protected, by both tariff and non-tariff barriers, from import competition. Table 8 shows the effects on the industry of removal of this protection, that are predicted by the model.

(Table 8 on separate sheet)

According to the model, there would be a large cut in output from high-cost capacity, more than half of which would be snapped up by lower cost domestic plants which would also gain from a boost in demand, with the net effect being a rather small (6.4 per cent) fall in domestic production and employment and a large net cost (due to the preservation of higher-cost plants when lower-cost plants could do the job).

Table 8: Employment, Production Imports and Costs of Protection in the Shipbuilding and Repair Industry: Predictions of Model

Actual - 1978			Without-Protection			Proportional Difference			
Employment	Value of production	Value of imports	Employment	Value of production	Value of imports	Employment	Value of production	Value of imports	Net economic cost
13456	5424	26.9	12573	507.6	182.9	-0.064	-0.064	5.80	114.3

This seems to be a definite case of the assumptions on which the model is based foundering on the extreme circumstances of the Canadian shipbuilding and repair industry.

The data show that the highest-cost plant in this industry was making a loss in 1978. The assumption made in the model is that losses are due to the industry 'going through a bad patch', and the cost distribution line is lowered so that maximum costs equal 1 (as a proportion of price -- i.e., breaking even), to reflect what are expected to be long-run or 'normal' cost conditions.

This procedure probably is invalid for this industry, for two reasons:

First, the excess of variable costs over value of production for the highest-cost plants is more than 30 per cent (Appendix A, Table 1, column 2) which is too large to be comfortably explained as a temporary phenomenon. The Industry, Trade and Commerce Sector Profile of this industry reported that (in 1977) 'some of the larger Canadian firms are experiencing significant losses in spite of (the protection given the industry) ...' (p. 9) and questions the viability of some shipyards (p. 8).

Second, the effect of lowering the cost line is to reduce the costs of lower-cost plants to just 13.2 per cent of value of production (Appendix A, Table 1, column 6). This is obviously ridiculous. It is most unlikely that many, or even any, of the low-cost plants are engaged in building ships. Instead, they are probably involved in the more profitable activity of repairing ships (which has accounted for about 20 per cent of industry value of production) and in non-marine production (e.g., railway car; hydroelectric equipment). Even if the losses of the high-cost plants were due to unusual (temporary) conditions in shipbuilding, adjusting for these should not involve changing costs of plants involved in repair and non-marine activities.

The difference in activities engaged in by high- and low-cost plants also means that the model's prediction that the low-cost operations would expand to fill part of the market vacated, after loss of protection, by high-cost establishments is invalid -- you cannot build new ships by repairing old ones.[23]

Given the unreliability of the model for shipbuilding and repair, and given, too, its importance as a heavily protected industry, it seemed worthwhile to rework the analysis under realistic assumptions.

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23 Though some substitution is possible -- purchase of a new vessel can be postponed by repairing or upgrading an existing craft.

This we do with the aid of Figure 1.

Line A on Figure 1 shows the distribution of industry costs from lowest to highest, as they actually were in 1978. Adding-on an allowance for capital costs to variable costs, and subtracting the effects of tariff protection on input cost (i.e. column 2 + column 3 - column 4, of Table 1, Appendix A) gives a value for the costs/price ratio of the highest-cost plant of 1.324[24], and 0.456 for the lowest-cost establishment.

We will assume that natural market pressures will force all those plants with costs greater than the value of their output to close-down, even with continuation of the various protective policies. Then $202.5 million of 1978 production will be eliminated, leaving an output of $333.9 million (in 1978 dollars).

Now consider the protection received by the industry. This takes two forms: (a) a tariff on imported ships, and (b) various subsidies to lower production costs of the domestic industries. In turn:

(a) The tariff rate on most imported vessels is 25 per cent (Sector Profile, p. 10). It is probably reasonable to assume that the potential ability of foreign shipbuilders to service the Canadian market is sufficient to force a sizeable response to any

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24 Cf. figure 2, p. 24, and Figure 5, p. 45 in the main paper for an elucidation of the cost distribution line concept.

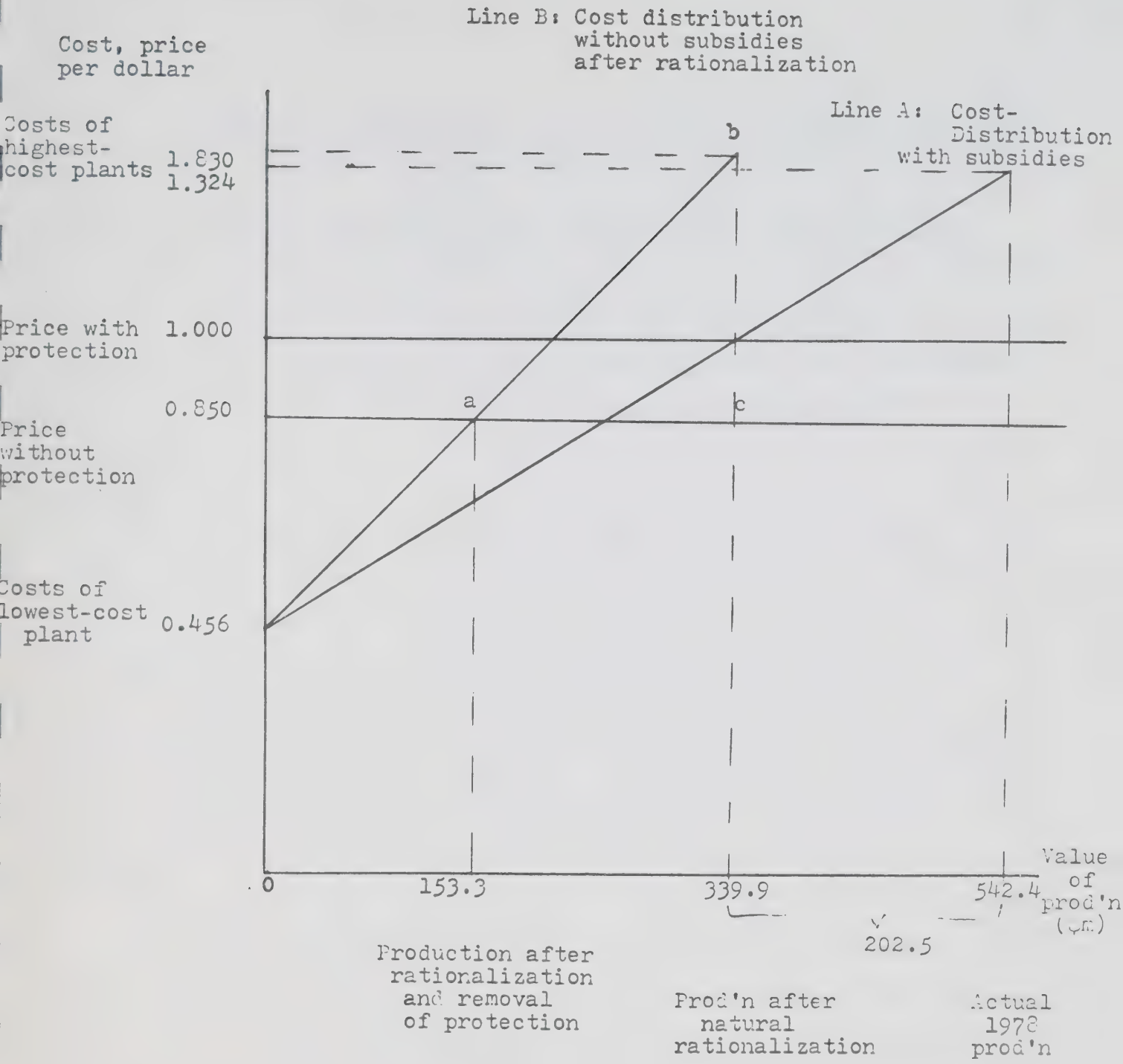

Figure 1: The 1978 Canadian Shipbuilding Industry

reduction in 'landed' import prices on the part of domestic shipbuilders, if the latter are to bid competitively.[25]

Given that 29 per cent of 1978 production was exported, and would not be affected by the tariff change (Appendix A, Table 3), we will assume that elimination of the 25 per cent tariff world force on average reduction of 15 per cent in the selling prices of domestic shipbuilders.

(b) The industry receives explicit or implicit assistance for its costs of production from a number of policies, including a direct 20 per cent subsidy or ships produced for the domestic market, some assistance under DREE and other programs, capital cost allowance benefits for shipowners, EDC and CIDA export financing, and a 'buy Canadian' policy for government procurement (Sector Profile, p. 4). In the model, a 'tariff-equivalent' of 50 per cent was assumed to summarize the effects of all those programs. This was an 'off-the-cuff' estimate given by an economist who had been involved in a study made of the industry. This figure seems to me to be rather large -- in any case, I will assume here, more conservatively, that the maximum effect of the various subsidies and supports is to reduce reported costs by 25 per cent.

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25 Cf. the Sector Profile, pp. 5-7, 11-13, for a description of the product characteristics of the industry.

These subsidies do not aid repair and non-marine activities, which we have assumed to account for the low-cost end of the industry. Therefore, I will assume that the cost subsidy ranges from 25 per cent for the highest-cost plant (after natural rationalization) to zero for the lowest-cost operation. The implied 'real' cost distribution (assuming linearity for simplicity and in the absence of contrary information), is drawn as line B on Figure 1.

The intersection of line B with the 'no-tariff' price line (= 0.85) gives the level of industry output that could survive elimination of all protection -- $153.3 million.

The direct cost-savings that would go with the elimination of protection are measured by the triangle abc (assuming that the price of the imports which replace production is 0.85 of the 1978 domestic price), which has an area of $43.3 million dollars.

Other cost savings would be realized if the surviving plants were able to expand into the market gaps left by the exiting shipyards. However, it is likely that a domestic industry output of $153.3 million would be dominated by repair and non-marine production, so that little expansion into ship-building would be likely.

We will not here attempt to assess the consumption efficiency gains and losses that would accompany elimination of protection, given the very drastic magnitude of the changes in consumption patterns involved.

It should be noted that the actual production cost losses in 1978 must have greatly exceeded $43.3 million, since these include the reported losses plus the subsidies received on the $202.5 million of output that apparently was produced at a loss in that year. We have assumed that normal market forces will eliminate this segment of the industry, even with no action on protection.

To conclude -- the numbers produced in this section should not be taken to be more than approximate estimates of the effects of protection, involving, as they do, a number of specific assumptions about the nature of cost and market conditions in the industry.

However, it is difficult to conceive of reasonable alternative scenarios, barring a resumption of the export boom of the 1973-76 period (cf. Sector Profile, p. 10), that could imply the viability of a significant proportion of Canadian shipbuilding activity, should all tariff and cost protection be taken away from the industry.

6. Soft Drinks

This 3-digit industry (SIC 1091) turns up with quite substantial costs of protection -- $18.0 million -- which result from higher costs of production permitted by a price 6 per cent higher than it would be if the 10 per cent tariff were abolished (Appendix A, Table 2, columns 2,4; Table 6, columns 5,6).

The model has almost certainly seriously overestimated the effect of the tariff. The manufacture of soft drinks gains substantial natural protection from the relatively high costs of of transporting the product. This is why imports supply only about 1 per cent of the Canadian market (Appendix, Table 3). It is most unlikely that removing the tariff on this 1 per cent would have a significant impact on the domestic industry.

7. Fabricated Structural Metals

This industry (SIC 3020) shows $20.0 million costs of protection. Imports, however, are only about 1 per cent of the total market, presumably due to transport costs, so that the actual effect of tariff protection is probably insignificant.

8. Miscellaneous Chemical Industries

Two of the 3-digit SIC chemical industries -- SIC 3780, Industrial Chemicals, and SIC 3790, Miscellaneous Chemicals -- showed net costs of protection of around $20 million in 1978 (Appendix A, Table 6, column 5). A closer examination was made of SIC 3790.

It turns out, of course, that there are numerous very different commodities included in the $1 billion shipments of 'miscellaneous' chemicals, and there are differences, too, in the degree of protection from import competition.

Printing Inks (SIC 3791) account for about 9 per cent of Miscellaneous Chemicals production. There is a tariff rate of 15 per cent, but imports only take about 7 per cent of the domestic market. The reason seems to be that inks tend to be sold in batches made up to customers' specification, and with technical services as part of the transaction, so that there is an advantage to having production facilities located near the markets, which implies a degree of natural protection from import competition.

Herbicides, Insecticides, Pesticides, etc. make up about 18 per cent of imports, and 7 per cent of domestic production in SIC 3790. Despite the significant domestic output, virtually all the imports enter dutyfree. This is partly (I expect) because these commodity are inputs into the politically powerful agricultural sector, and partly because a large proportion of imports are active ingredients, whereas the domestic industry is only involved in 'compounding' (mixing) active with inactive ingredients. Because of the bulk of inactive ingredients, domestic compounding is naturally protected by transport costs from competition from imported compounds.

The largest single commodity component of domestic production is Explosive fuses and caps (incl. ammunition and pyrotechnics) which account for about 22 per cent of 1978 domestic output. Imports only supply about 7 per cent of the domestic market. This may be due to the quite high tariff (19 per cent) and/or to non-tariff barriers, such as procurement policies of the Canadian armed forces.

A large number of heterogenous commodities make up the balance of the Miscellaneous Chemicals market. In general, tariff rates are around 15 per cent, and the market is supplied from both imported and domestic sources.

Clearly, there is a large variety of cost and market conditions within the 'miscellaneous chemicals' category. On the whole, however, it appears that market forces act through the industry in a way that is consistent with the assumptions imbedded in our model, which may therefore be able to come up with a useful summary of the effects tariff protection has or the industry. The alternative to trusting the model is the vastly more expensive process of carrying out detailed case studies of each commodity.

9. Dairy Products (SIC 1040)

This industry prepares and packages fluid milk, and manufactures milk-based products such as butter, cheese, ice cream, condensed milk, and skim milk powder. Assessing the impact of protection on the dairy products industry is complicated by the existence of expensive policies designed to protect the primary (farm) dairy industry from which the manufacturing industry purchases its main inputs.

The net economic costs of primary dairy protection have been estimated at $200 million a year, and the transfers from consumers and taxpayers at about $1 billion [26] -- numbers much larger than any estimated for a single manufacturing industry in this study.

As a further complication, trade in processed dairy products, except cheese, is controlled by the Canadian Dairy Commission-the Federal agency responsible for administering the protective policies to dairy farming.

Normally, we would expect a processing industry to gain from abolition of protection on its inputs, through lower prices for these, but in this case, owing to the perishable nature of milk, the viability of further processing depends heavily on the viability of dairy farming.

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26 Richard R. Barichello, 'The Economics of Canadian Dairy Industry Regulation' prepared for the Regulation Reference of the Economic Council of Canada, February 1981.

Under probably pessimistic assumptions about the elasticity of world supplies, Soe Lin has estimated nominal protection on a composite 'milk-equivalent' dairy product to be 77 per cent[27] and that elimination of this would result in dairy imports increasing from 6 per cent to 29 per cent of domestic consumption.

This 19 percentage points change is consistent with Barichello's prediction that total domestic milk production would drop by 20 per cent (op. cit., p. 65).

If we assumed that the processing industry contracted by the same proportional amount, its 1978 value of production of $3398 million would fall to $2720 million, and employment by 5 400, to 21 600. The industry could reduce this fall by shifting into higher-value product lines, such as cheese, though, as noted above, cheese imports are presently the one dairy product not controlled by the CDC.

If we further assumed that various restrictions on dairy processing limiting the reallocation of output to the most efficient operators were also dismantled (cf. Barichello, p. 45), and that the 20 per cent cut in production could be taken by the highest-cost firms, then the intra-industry cost savings would be about $21 million a year -- a significant number, though only one-tenth of the estimates of savings to be made in the primary Dairy industry.

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27 Soe Lin, 'Effective Protection Rates for Selected Canadian Agricultural Commodities', Internal Trade Policy Division, Agriculture Canada, May 1980 (Appendix D).